Document 1_Report.RCRA.754006.2019-02-28.2018 Owego Annual Report

Document 2_NYSDEC_Site_Summary_IBM_Owego_081120

SUPPORTING DOCUMENT 1



8976 Wellington Road Manassas, VA 20109

February 28, 2019

Jessica LaClair
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D
625 Broadway, 12th Floor
Albany, NY 12233-7013

Subject: 2018 Annual Report, Groundwater Monitoring Program

Former IBM Facility, Owego, New York

Reference: 6NYCRR Part 373 Hazardous Waste Management Permit

No. 7-4930-00095/00005

Dear Ms. LaClair:

Attached is the 2018 Annual Report for the Groundwater Monitoring Program at the former IBM facility in Owego, New York. This report is being submitted in accordance with the facility's Part 373 Permit and Groundwater Monitoring Plan. An EDD for the data in this report is also being submitted to NYENVDATA.

Should you have any questions concerning this report, please contact me at 703-257-2582 or by email at brandon.ashby@ibm.com.

Sincerely,

Brandon Ashby, P.G., R.E.M.

Program Manager - Environmental Remediation

IBM Corporate Environmental Affairs

Attachment

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RCRA Programs Branch, EPA Region 2, New York (w/o att.)



2018 ANNUAL REPORT GROUNDWATER MONITORING PROGRAM FORMER IBM FACILITY OWEGO, NEW YORK 6NYCRR PART 373 PERMIT NO. 7-4930-00095/00005

Prepared for:

IBM Corporate Environmental Affairs 8976 Wellington Road Manassas, Virginia 20109

February 28, 2019

Prepared by:

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Professional Geologist Certification 2018 Annual Report **Groundwater Monitoring Program Former IBM Facility** Owego, New York

6NYCRR Part 373 Permit No. 7-4930-00095/00005 Site #754006

February 28, 2019

As the person with primary responsibility for the performance of the geological services and activities associated with the captioned report, I certify that I have reviewed the document entitled "2018 Annual Report, Groundwater Monitoring Program, Former IBM Facility, Owego, New York" prepared pursuant to Modules II.H (Corrective Action Program) and III.D (Reporting Requirements for Groundwater Monitoring) of 6NYCRR Part 373 Hazardous Waste Management Permit No. 7-4930-00095/00005 dated March 30, 2010. This report is dated February 28, 2019 and was prepared for IBM Corporation by Groundwater Sciences Corporation and Groundwater Sciences, P.C.

I certify that the associated geological services and this report have been prepared under my direct supervision. To the best of my knowledge, all such information contained in this report is complete and accurate.

This report bears the seal of a professional geologist. No alterations may be made to the information contained in this report unless made in accordance with Title 8, Article 145, Section 7209 of New York State Education Law.

Charles A. Rine Date: February 28, 2019 Signature:

Charles A. Rine Name:

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State: New York

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- Third Quarter 2018 groundwater elevations were measured on July 16, 2018 in the Tank Farm Area and Parking Lot 001 Area in the northern part of the Site.
- Fourth Quarter 2018 groundwater elevations were measured on November 26, 2018 in the Waste Management Area, Southern and Western Boundary Areas, and Tower View Drive / Mirror Lake Area in the southern part of the Site.
- Third Quarter 2018 groundwater sampling occurred in July 2018 in the Tank Farm Area and Parking Lot 001 Area in the northern part of the Site.
- Fourth Quarter 2018 groundwater sampling occurred in November and December 2018 in the Waste Management Area, Southern and Western Boundary Areas, and Tower View Drive / Mirror Lake Area in the southern part of the Site.

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- Appendix B Table B-1: Well Specifications, Corrective Action Monitoring Program
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1 INTRODUCTION

This report has been prepared by Groundwater Sciences Corporation (GSC) for the International Business Machines Corporation (IBM). Its purpose is to satisfy the annual reporting requirements for IBM's former Owego, New York facility (the "Site"), located approximately one mile southeast of the village of Owego, New York (**Figure 1-1**).

1.1 Regulatory Reference

This annual report is being submitted to the New York State Department of Environmental Conservation (NYSDEC), Division of Environmental Remediation in accordance with Modules II.H (Corrective Action Program) and III.D (Reporting Requirements for Groundwater Monitoring) of the Site's 6NYCRR Part 373 Hazardous Waste Management Permit (Part 373 Permit) No. 7-4930-00095/00005, with an effective date of March 30, 2010. Groundwater monitoring data generated from January 1 to December 31, 2018, including groundwater extraction volumes, groundwater elevations, and analytical chemistry data, is presented in this report. Groundwater monitoring data generated between January 1 and June 30, 2018 was also presented in the 2018 Semiannual Data Report previously submitted to NYSDEC on August 30, 2018. In accordance with the Module II.H.3 requirements, contaminant levels and the effectiveness of the corrective measures program are evaluated in this report.

1.2 Organization of Report

This report is organized as follows. Section 1.3 provides background on the Groundwater Monitoring Program and Section 1.4 provides an overview of the Site's hydrogeologic setting. Section 2 discusses the groundwater sampling and related data collected during 2018 for the Groundwater Monitoring Program, including extraction well pumping data and quality control (QC) analytical chemistry data. Section 3 evaluates the groundwater extraction, hydrogeology, and groundwater chemistry in various areas of the Site, including the Tank Farm Area and the Parking Lot 001 Area (P001 Area) in the northern part of the Site, and the former Waste Management Area, Tower View Drive and Mirror Lake Areas, Southern Boundary Area and Western Boundary Area in the southern part of the Site. These areas and all active monitoring and extraction wells are shown on Plate 1-1. Section 4 presents the status of vapor intrusion assessment and mitigation-related work that was completed in 2018 at the Site by Sanborn Head, Engineering, PC (SHPC) for IBM.

1.3 Background Information

IBM submitted a Resource Conservation and Recovery Act (RCRA) Post-Closure Permit Application to NYSDEC and the United States Environmental Protection Agency (USEPA) in June 1987 for the former Waste Management Area at the Site. As required by RCRA regulations, IBM established a quarterly Groundwater Monitoring Program for the Site, including the former Waste Management Area. The groundwater monitoring network and its operation, maintenance, and reporting conditions were subsequently incorporated into the Site's Part 373 Permit, which required the preparation of Groundwater Monitoring Plan (GMP). The GMP was approved by NYSDEC in March 1995 and has been revised several times in the past 24 years as extraction wells and monitoring wells have been added or removed, and the site-specific list of analytical parameters has been changed. The GMP describes the corrective action groundwater monitoring network in detail, including the groundwater treatment process, wells, sampling frequencies, analytical parameters, and semiannual and annual reporting requirements.

1.4 Overview of Site Geology and Hydrogeology

The geology underlying the former IBM Owego Site consists of three primary geologic zones or units (from oldest to youngest): (1) bedrock, consisting of shale and siltstone of the Devonian West Falls Group; (2) unconsolidated sediments of glacial origin (till) consisting of a dense mixture of clay, silt, sand, gravel, and boulders; and (3) other unconsolidated sediments of various depositional origins, including alluvium, glaciolacustrine silt, glaciofluvial sands and gravels (outwash) and fill. The bedrock is weathered to varying degrees on its upper surface, and this zone of weathered bedrock is very thin or absent in some areas. The unconsolidated sediments are discontinuous units that vary greatly in thickness and hydraulic conductivity across the Site. The till typically exhibits a very low hydraulic conductivity and is not a significant water-transmitting unit. A shallow unconfined upper water-bearing zone in the alluvium and glaciofluvial deposits is referred to in this report as the alluvial zone. A deeper thin confined water-bearing zone within weathered bedrock along the interface between glacial till and the underlying competent bedrock is referred to in this report as the till/bedrock interface zone or till/bedrock zone.

Groundwater elevation contour maps were constructed for the till/bedrock zone using July 2018 data from the northern part of the Site and November 2018 data from the southern part of the Site

(**Figure 1-2**). Similar maps were published in the 2018 Semiannual Data Report using February and June 2018 data from the till/bedrock zone. Except where influenced by the extraction wells, groundwater flow in the till/bedrock zone is generally from northeast to southwest across the Site toward Barnes Creek, which flows into the Susquehanna River. The Susquehanna River is located approximately 800 feet southwest of the Site's southern boundary, as shown on **Figure 1-1**.

Groundwater elevation contour maps were also constructed for the alluvial zone using July 2018 data from the northern part of the site and November 2018 data from the southern part of the site (**Figure 1-3**). These maps show the discontinuous nature of the alluvial zone, where groundwater flow is strongly influenced by the extraction wells in the P001 Area and former Waste Management Area. The alluvial zone is generally absent in the Tank Farm Area and in the northern portions of the former Waste Management Area and in the Tower View Drive and Mirror Lake Areas.

2 GROUNDWATER MONITORING PROGRAM

Quarterly field activities for the groundwater monitoring program consist of groundwater elevation measurements, groundwater sampling, and well inspections. These activities were performed in accordance with the approved GMP by qualified field personnel from GSC.

2.1 Groundwater Extraction Wells

In 2018, the Site's groundwater extraction and treatment system consisted of as many as six extraction wells and a packed-column air stripping tower designed to remove volatile organic compounds (VOCs) from groundwater. In 2019, the system will include six extraction wells. As shown on **Plate 1-1**, the extraction wells are located in three areas:

- 1. In the Tank Farm Area (TFA), extraction well 415 pumps from the till/bedrock zone and was installed in 2008, replacing several wells that were ineffective. Well 415 operated throughout 2018.
- 2. In the Parking Lot 001 Area:
 - a. Extraction well 413 pumps from the till/bedrock zone and was installed in 1982. Well 413 operated throughout 2018.
 - b. Extraction well 414 pumped from both the alluvial and till/bedrock zones and was a low yield, dual-zone extraction well screened from the till/bedrock interface zone up to the base of the alluvial zone. The well was installed in 1990 and replaced extraction well 402, which was installed in 1981. During the past several years, well 414 experienced intermittent issues associated with a degraded/corroded casing, failing pumps, and fouling, and the steel-cased section of the well was stabilized by relining with a thin fiberglass liner. The lower fiberglass liner apparently failed on August 3, 2018, allowing formation material (rock fragments) to enter and plug the well. Attempts to remove the well pump using a heavy hoist truck were unsuccessful due to binding of the pump with collapsed formation material. Soil boring 418A, which had been drilled five feet northeast of well 414 in April 2018, was used to generate a detailed well log for installing a replacement extraction well screened

solely in the alluvial zone and fill; soil samples collected from boring 418A were used for sieve analysis and selection of a slot size for the replacement well screen. Replacement extraction well 418 was subsequently installed in mid-September 2018 on an accelerated schedule and began pumping on November 15, 2018.

- c. Extraction well 416 is a low-yield well that pumps from the till/bedrock zone. Well 416 began pumping in August 2015 as a replacement for extraction well 412, which pumped primarily from the alluvial zone until it was shut down due to internal well damage in October 2014. Although well 416 operated throughout 2018, its poor performance prompted its replacement by well 417, located about 400 feet west of well 416. Well 417 began pumping during the first quarter of 2019.
- 3. In the Waste Management Area, extraction well 404 is a dual-zone well that pumps from both the alluvial and till/bedrock zones and extraction well 405 pumps primarily from the alluvial zone. Wells 404 and 405 were installed in 1981 and are equipped with multiple screened intervals. Both wells operated throughout 2018.

As noted above, extraction well 418 replaced extraction well 414 during the fourth quarter of 2018, and extraction well 417 replaced extraction well 416 during the first quarter of 2019. Extraction well 417 was installed following a 2018 investigation¹ conducted, in part, to identify a location in the P001 Area with a till/bedrock interface zone of sufficient transmissivity for a new extraction well.

A report on the design, installation and performance testing of extraction well 417 is presented in **Appendix J** and a similar report for extraction well 418 is presented in **Appendix K**.

¹ Remedial Alternatives Investigation Report for the Northern Plume & Parking Lot 001 Area, Former IBM Facility, Owego, New York, 6NYCRR Part 373 Permit No. 7-4930-00095/00005, prepared by Groundwater Sciences Corporation for IBM Corporate Environmental Affairs, September 26, 2018.

Except for brief periods of testing and maintenance, the groundwater extraction and treatment system has operated continuously since April 1990. Approximately 4.8 billion gallons of groundwater has been extracted and treated since 1985.

2.1.1 Summary of Significant Maintenance Activities

The following significant maintenance activities were performed on the groundwater monitoring wells, extraction wells, and treatment system in 2018:

- 1. A new pump was installed in well 414 on January 26.
- 2. The flow meters for wells 413, 414, 415 and 416 were cleaned on March 1 and March 2.
- 3. Piping repairs were completed on the blower, Groundwater Treatment Facility (GTF), and conveyance tunnel on March 6, and the power house sump line repair was completed on March 16.
- 4. A new pump was installed in well 414 on March 29.
- 5. A new pump was installed in well 416 on April 5.
- 6. A new pump was installed in well 415 on May 30.
- 7. New pumps were installed in wells 414 and 416 on June 19.
- 8. The flow meters for wells 413, 414, 415, and 416 were cleaned on June 19.
- 9. The conveyance line from the P001 Area well house to the GTF was flushed with approximately 150 gallons of potable water at a rate of 35 gpm on June 19.
- 10. The pump motor in well 415 was replaced on June 28.
- 11. The flow meters for wells 413, 414, and 416 were cleaned on August 3.
- 12. An attempt was made to pull the pump from well 414 on August 15. The pump and discharge line could not be removed.

- 13. The flow meters for wells 413, 414, and 416 were cleaned on September 26.
- 14. The discharge lines from wells 413 and 414 and the conveyance line from the AP well house to the GTF were water-jetted on September 26.
- 15. New pumps were installed in wells 413 and 416 on September 27.
- 16. The flow meter for well 416 was cleaned on November 12.
- 17. A well pump, pump motor, discharge line and electrical lines were installed in new extraction well 418 on November 15.
- 18. The flow meter was cleaned and a new pump was installed in well 415 on November 30.
- 19. A new pump was installed in well 416 on November 30.
- 20. The flow meters for wells 413, 415, 416, 417, and 418 were calibrated on December 5.
- 21. The power house sump meter was calibrated on December 5.
- 22. The transfer piping for well 414 in the GTF was cleaned on December 6.
- 23. The flow meters for wells 404 and 405 and for the air stripper feed flow meters were calibrated on December 6.

2.1.2 Pumping Volumes

The pumping volume at each extraction well is recorded electronically. **Table A-1** in **Appendix A** shows metered monthly pumping volumes in 2018 for the extraction wells in the Waste Management Area (wells 404 and 405), Parking Lot 001 Area (wells 413, 414/418, and 416) and Tank Farm Area (well 415). The volume of groundwater extracted in 2018, as measured by flow from the GTF to the permitted NPDES discharge Outfall 999M, was 129.5 million gallons (Mgal), slightly greater than the average annual flow during the previous 17 years (126.4 Mgal).

The flow from the GTF to the outfall is measured on a single effluent meter and is not connected to the individual flow meters at each extraction well. The sum of the flows recorded by the extraction well meters in 2018 was about six percent higher than the total flow recorded by the GTF effluent

meter. There are various reasons for the difference between these two flows, including meter placement, long pipe runs, and intermittent flows from low-yielding extraction wells that might affect meter accuracy. In addition, following flow testing and recalibration of the flow meter for extraction well 404 in December 2018, the flows for the first 11 months of 2018 were restated by a factor of 1.4. Uncertainty in the rate of drift between December 2018 and the previous calibration in 2017 means that the flow measured at well 404 is estimated.

2.1.3 Evaluation of Treatment Efficiency

Treatment efficiency for the groundwater treatment system was calculated by comparing concentrations of VOCs in the GTF influent with the concentrations of VOCs in the treated effluent discharged from the air stripping tower. The influent and effluent were sampled monthly in 2018 in accordance with the Site's National Pollutant Discharge Elimination System (NPDES) Permit Number NY0244597. No EPA Method 624 VOCs were detected in any of the monthly effluent samples collected in 2018, suggesting a VOC removal efficiency of 100 percent.

2.2 Groundwater Monitoring Wells

The Site's Corrective Action Monitoring Program consists of 142 wells. Physical specifications for the monitoring and extraction wells used in 2018 are listed on **Table B-1** of **Appendix B**.

2.2.1 Groundwater Elevation Measurements

Groundwater elevations were measured in 140 of the 142 wells listed on **Table B-2a** of **Appendix B**. (Extraction wells 404 and 405 are not accessible for manual groundwater elevation measurements.) These include 130 on-Site wells, four off-Site wells (540, 541, 542, 543) in the Route 17C interchange area south of the Southern Boundary Area, and six off-Site wells (521, 522, 524, 529, 532, 534) on the Moore Tire property located west of the P001 Area. In addition to these wells, new monitoring wells 700 and 701 were installed in the P001 Area in 2018 and were measured during the second half of 2018.

Groundwater elevations were calculated by subtracting the measured depth to water from the surveyed elevation of the measuring point listed in **Appendix C**. The designated measuring point for most wells is the top of the inner well casing (i.e., "TOC Elevation"). Groundwater elevations

were measured quarterly on February 26, June 4, July 16, and November 26, 2018. Groundwater elevations were also measured in a supplemental event on December 5, 2018 to establish baseline conditions in the P001 Area following the startup of extraction well 418 in November 2018. The tabulated groundwater elevation data for 2018 are presented in **Appendix C**. Groundwater elevation data since 1997 is maintained in an Access database and has been published in previous semiannual and annual reports.

2.2.2 Monitoring Well Inspections and Dedicated Equipment

In addition to the inspection performed when each monitoring well was sampled, a comprehensive annual inspection of the well field was performed during the February and June 2018 sampling events. This inspection included the following items: (1) measurement of depth to well bottom and comparison of this depth to the reference depth to determine the need for redevelopment, (2) assessment of the legibility of the well tag and visibility of the survey mark, (3) determination of whether the well standpipe needs to be painted and whether the location should be cleared of brush/weeds, (4) assessment of the condition of the well seal, and (5) description of dedicated equipment (if any) and the condition of the bailer cable.

The well inspection summary table in **Appendix C** also shows the type of sampling device used in each well. Polyethylene diffusion bag (PDB) sampling devices are used in many monitoring wells and significantly reduce the volume of purge water generated during groundwater sampling. The PDB samplers are typically set at the midpoint of the water column in each well.

2.2.3 Groundwater Sampling

Table B-2b of **Appendix B** lists the wells that are required by the GMP to be sampled and analyzed quarterly, semiannually, or annually. Other wells not listed on **Table B-2b** of the GMP were sampled voluntarily, including the groundwater extraction wells.

The 2018 sampling schedule for the groundwater monitoring program is summarized in **Appendix D**. For wells sampled semiannually, a staggered quarterly sampling arrangement was approved by NYSDEC, whereby the semiannual sampling events in the northern and southern parts of the Site are scheduled in alternating quarters so as to evenly distribute the sampling field work over the course of the year.

The quarterly sampling events for 2018 occurred during the following periods:

- 1. February 7, February 14 and February 26 to March 1;
- 2. June 4 to June 8;
- 3. July 16 to July 19;
- 4. November 27, November 28, and from December 3 to December 6.

All groundwater samples collected during 2018 were analyzed by Eurofins Lancaster Laboratories Environmental (NYSDOH ELAP #10670). The completed chains of custody (COCs) for 2018 are shown in **Appendix E** of this report.

None of the wells scheduled to be sampled in the northern part of the Site during the second and fourth quarters was dry. (Although well 114 in the Tank Farm Area was dry in February and July, it is not routinely sampled). Of the wells that were scheduled to be sampled in the southern part of the Site during the second and fourth quarters, none was dry.

The remainder of this section discusses the analytical results for samples collected in 2018 from groundwater monitoring wells and extraction wells, and for field QA/QC samples.

2.2.3.1 Groundwater Chemistry Results

Chemistry data generated from groundwater monitoring activities is maintained in a database by GHD, Inc. (GHD). This database contains groundwater analytical chemistry and field quality control (QC) data from 1993 to the present. Analytical chemistry data generated by the laboratory is transmitted to GHD and GSC electronically. The data is periodically reviewed for outliers, new high or low concentrations, and missing data.

A summary printout of the groundwater analytical chemistry data for all samples collected in 2018 from monitoring wells and extraction wells is presented in **Appendix F**. This summary includes results for pH, temperature, turbidity, and specific conductance measured in the field at the time of sampling. The summary data presented in **Appendix F** are shown in alphanumeric ascending order by sample location, and chronologically by sample date for each location.

2.2.3.2 Volatile Organic Compounds in Groundwater

The principal chemicals detected and of concern at the Site are chlorinated ethanes and ethenes. These and other chlorinated volatile organic compounds (CVOCs) are discussed further in Section 3.3.1. Twelve CVOCs were detected in groundwater in 2018 at concentrations greater than the applicable New York State Groundwater Quality Standard (NYSGQS).

Table 2-1 lists the 16 parameters analyzed in groundwater for the Site's Groundwater Monitoring Program together with the NYSGQS for each parameter, the maximum concentration of each parameter measured in 2018, and the monitoring well and extraction well where the maximum concentrations were detected. Dichlorodifluoromethane (Freon 12) has not been detected at concentrations greater than its NYSGQS (5 micrograms per liter (ug/L)) since 2007 and trichloromethane (chloroform) has not been detected at concentrations greater than its NYSGQS (7 ug/L) since 2008. Freon 11 has not been detected in any groundwater sample since January 2006.

Minimum, median, and maximum concentrations for the monitoring wells and extraction wells during the 27-year period from 1993 to 2018 are summarized in **Appendix G**.

Table 2-1. Analytical Parameters for the Groundwater Monitoring Program*						
Parameter	NYSGQS (ug/L)	Maximum Concentration Measured in a Monitoring Well in 2018	Maximum Concentration Measured in an Extraction Well in 2018			
Detected at a concentration greater than the NY	sgqs:					
1,1,1-Trichloroethane (111-TCA)	5	3,900 ug/L @ 609	1,100 ug/L @ 415			
1,1-Dichloroethane (11-DCA)	5	2,200 ug/L @ 609	1,400 ug/L @ 414			
1,1-Dichloroethene (11-DCE)	5	1,000 ug/L @ 128	840 ug/L @ 415			
Tetrachloroethene (PCE)	5	19 ug/L @ 610	16 ug/L @ 415			
Trichloroethene (TCE)	5	660 ug/L @ 612	1,200 ug/L @ 415			
cis-1,2-Dichloroethene (c12-DCE)	5	750 ug/L @ 128	2,200 ug/L @ 415			
Vinyl chloride	2	31 ug/L @ 625	120 ug/L @ 415			
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	5	450 ug/L @ 609	120 ug/L @ 415			
1,2-Dichloro-1,2,2-trifluoroethane (Freon 123a)	5	54 ug/L @ 609	31 ug/L @ 414			
Methylene chloride (DCM)	5	9.3 ug/L @ 612	Not detected			
1,2-Dichloroethane	0.6	3.3 ug/L @ 128	4.7 ug/L @ 415			
1,1,2-Trichloroethane	1	8.7 ug/L @ 128	4.1 ug/L @ 415			
Not detected at a concentration greater than the	NYSGQS:					
Dichlorodifluoromethane (Freon 12)	5	1.9 ug/L @ 382	Not detected			
Chloroethane	5	3.4 ug/L @ 521	1.6 ug/L @ 416			
Trichloromethane (Chloroform)	7	1.5 ug/L @ 183	1.2 ug/L @ 404			
Trichlorofluoromethane (Freon 11)	5	Not detected	Not detected			

*from Table 1-1 of *Groundwater Monitoring Plan, Former IBM Facility, Owego, New York* (December 2006). NYSGQS = New York State Groundwater Quality Standard (from 6 NYCRR Part 703.5, Table 1, Class GA) ug/L = micrograms per liter

2.2.3.3 Quality Control Results for Environmental Blanks

Environmental blanks, consisting of equipment rinse blanks and trip blanks, were collected and analyzed in 2018 for quality control purposes. The analytical chemistry data for these environmental blank samples is presented in **Appendix H**.

Trip blanks were prepared by the laboratory for each sampling round using analyte-free deionized (DI) water for each cooler containing samples for CVOC analysis. The purpose of the trip blanks is to detect contamination encountered or generated during sample transportation or storage. A trip blank was the first item placed into each cooler by the laboratory and accompanied the sample containers from the laboratory to the field sampling locations and back to the laboratory. Seventeen trip blanks were collected in 2018 and the analytical results for these trip blanks are presented in **Appendix H**. Groundwater samples associated with each trip blank can be determined by noting the "Sample Date" of the trip blank in **Appendix H** and cross-checking this date with the trip blanks listed on the COCs in **Appendix E**. All trip blank labels begin with the letters "OTB" in the "Sample Identification" section of the COC. Only one CVOC was detected in one of 17 trip blanks: TCE was detected in December 2018 at an estimated concentration (i.e., "J"-qualified) of 0.2 ug/L. This detection is being discussed with the analytical laboratory.

Equipment rinse blanks were collected to confirm the efficiency of decontamination procedures by rinsing non-dedicated equipment such as water level indicators with analyte-free deionized water and collecting the rinse water in sample bottles for analysis. Seventeen equipment rinse blanks were collected in 2018 from water level indicators and the analytical results for these blanks are presented in **Appendix H**. Six CVOCs on the Site's parameter list (**Table 2-1**) were detected in equipment rinse blanks in 2018. Five of these CVOCs were detected at estimated concentrations greater than or equal to the method detection limit (0.1 ug/L) but equal to or less than the limit of quantitation (0.5 ug/L). TCE was detected at concentrations of 1.0 to 1.2 ug/L in four equipment rinse blanks collected in July 2018 from a water level indicator; these detections may be the result of incomplete decontamination of the water level indicator or the possible presence of TCE in the atmosphere of the space where the deionized (DI) rinse water from the laboratory was being stored. In addition to changing the storage location of the DI water, increased attention and improvements to decontamination procedures will be undertaken in 2019. None of the groundwater analytical chemistry results from monitoring wells required qualification based on the detections of CVOCs in environmental blanks.

3 EVALUATION OF HYDROGEOLOGY AND HYDROGEOCHEMISTRY

This section evaluates the groundwater monitoring data collected during 2018. Current data are presented in the form of potentiometric and isoconcentration contour maps and are also evaluated in the context of historical trends. As required by the Site's Part 373 Permit, this evaluation includes a delineation of the limits of hydraulic control in areas with sufficient data for such delineation.

3.1 Groundwater Extraction

As noted in Section 2.1.2, **Table A-1** of **Appendix A** contains a table of volumes pumped in 2018 from the Site's groundwater extraction wells. Details of this pumping data are discussed below.

3.1.1 Northern Part of the Site

Hydraulic control and contaminant removal in the northern part of the Site is accomplished by the operation extraction wells in the Tank Farm Area and P001 Area.

3.1.1.1 Parking Lot 001 Area

Figure 1-2 show the locations of the three extraction wells (413, 414, and 416) in the P001 Area that were operating in July 2018 and **Plate 1-1** shows the locations of the two new extraction wells (417 and 418) that were installed in September 2018. The monthly flows from wells 413, 414, 416, and 418 (which replaced well 414 in November 2018) are shown on **Table A-1** of **Appendix A**. Extraction well 417 was not pumped in 2018. The combined monthly flow from the P001 extraction wells in 2018 ranged from 238,000 to 347,000 gallons.

Well 416 pumped approximately 222,000 gallons in 2018 at an average rate of 0.4 gallons per minute (gpm). With an average total CVOC concentration of 1,600 ug/L from quarterly samples, well 416 removed an estimated 3.0 pounds of CVOCs by groundwater extraction from the till/bedrock zone in 2018.

Extraction well 413 was pumped at an average rate of 4.7 gpm in 2018. With an average total CVOC concentration of 210 ug/L from quarterly samples, well 413 removed an estimated 4.4 pounds of CVOCs by groundwater extraction from the till/bedrock zone in 2018.

Extraction wells 414/418 were pumped at an average rate of 2.2 gpm in 2018. (Neither well 414 nor well 418 operated from mid-August to mid-November, and so the average rate from this well location is based only on whole months of pumping.) With an average total CVOC concentration of 2,000 ug/L from quarterly samples, well 414 (from January through mid-August with three quarterly samples) and well 418 (from mid-November through December with one quarterly sample) removed an estimated 14 pounds of CVOCs by groundwater extraction in 2018, primarily from the alluvial zone.

3.1.1.2 Tank Farm Area

Tank Farm Area extraction well 415 (**Figure 1-2**) pumped from the till/bedrock zone at an average rate of approximately 0.9 gpm in 2018. Compared to the other extraction wells at the Site, the volume extracted from well 415 is low and accounted for about 0.3% of groundwater extraction in 2018, similar to previous years. However, compared to all of the other extraction wells, the concentration of total CVOCs in well 415 was high (ranging from 5,700 to 6,400 ug/L) and, consequently, the total CVOC mass recovered by well 415 (about 24 pounds in 2018) was comparable to the combined CVOC mass recovered by the P001 Area extraction wells.

3.1.2 Southern Part of the Site

Wells 404 and 405 extract groundwater in the southern part of the Site (**Figure 1-3**) and accounted for more than 95% of the groundwater volume pumped in 2018. The monthly flow from each of these wells is shown on **Table A-1** of **Appendix A** and the combined average pumping rate from both wells was approximately 270 gpm in 2018.

3.2 Hydrogeology

As explained in Section 1.2 and shown on **Plate 1-1**, the Tank Farm Area is located in the northeastern part of the Site and the P001 Area is located in the northwestern part of the Site. The former Waste Management Area, Tower View Drive and Mirror Lake Areas, Western Boundary Area, and Southern Boundary Area are all located in the southern part of the Site. The hydrogeology of the northern and southern parts of the Site is discussed separately in the following sections.

3.2.1 Tank Farm Area

The geologic units in the Tank Farm Area consist primarily of till overlying bedrock, with some localized areas of fill. The monitoring wells in this area are screened in the fill, till, till/bedrock zone, or shallow bedrock. The shallow water-bearing "alluvial zone" unit present to the west of the Tank Farm Area appears to be absent in the Tank Farm Area. As a result, the till/bedrock zone is the most significant water-transmitting unit in the Tank Farm Area and extraction well 415 is screened in that unit.

The groundwater flow divide shown on **Figure 1-2** for the till/bedrock zone in the Parking Lot 001 and Tank Farm Areas on July 16, 2018 delineates the area where groundwater is captured by extraction well 415. Outside this area of capture, the direction of groundwater flow in the till/bedrock zone is generally to the west toward the P001 Area and to the southwest toward the Tower View Drive and Mirror Lake Areas.

3.2.2 Parking Lot 001 Area

The P001 Area is underlain by a bedrock valley originating as a closed depression in the bedrock surface with its deepest point situated between till/bedrock zone wells 393 and 395 (**Figure 1-2**). Drilling investigations performed in the early 1990s and a seismic refraction study conducted in 2017 determined that the buried bedrock valley extends westward from this depression, passing through a narrow throat at bedrock well 378 on Lakeview Parkway, and opening up off-Site to the southwest of well 378 beneath the Moore Tire property. In the P001 Area, this bedrock valley contains four hydrogeological units, from lowermost to uppermost: (1) weathered bedrock, (2) till, (3) sand, silt, and gravel, and (4) fill, which is more than 20 feet thick in some places. The primary water-bearing units in the P001 Area are the till/bedrock zone (straddling units 1 and 2) and the alluvial zone (unit 3).

Detailed groundwater elevation contour maps have been constructed semiannually since 1993 for both the till/bedrock zone and the alluvial zone in the P001 Area. **Figure 1-2** shows the groundwater elevation contours for the till/bedrock zone in the P001 Area constructed from groundwater elevation data collected on July 16, 2018. The generalized direction of groundwater flow in the till/bedrock zone is indicated by the flow arrows on this map, and the hydraulic

influence of P001 Area extraction wells 413 and 414 in the till/bedrock zone is apparent. **Figure 1-2** also shows a groundwater flow divide in the vicinity of Lake View Parkway. On the eastern side of this flow divide, groundwater flow in the till/bedrock zone is captured by the P001 Area extraction wells. On the western side of the divide, groundwater flows to the southwest across the Moore Tire property and back onto the Site in the northern part of the former Waste Management Area.

Figure 1-3 shows the groundwater elevation contours for the alluvial zone in the P001 Area on July 16, 2018 when extraction well 414 was the only well affecting groundwater flow in the alluvial zone in the P001 Area. The groundwater flow divide in the alluvial zone during the third quarter of 2018 was situated near or west of Lake View Parkway. Groundwater in the alluvial zone east of the flow divide was being captured by extraction well 414 in July 2018, and has been captured by extraction well 418 since November 2018. Groundwater in the alluvial zone west of the flow divide flows to the southwest through a zone of coarse alluvium extending across the center of the Moore Tire property and back onto the Site north of Building 352.

3.2.3 Southern Areas

Weathered bedrock and till overlie competent bedrock in the southern part of the Site. In the southern and central portions of the southern part of the Site, the till is overlain by relatively permeable outwash sand and gravel and, in some areas, by low-permeability glaciolacustrine silt. The entire area is covered by a surficial layer of post-glacial alluvium. This surficial alluvium is different from the deeper "alluvial zone" discussed elsewhere in this report.

3.2.3.1 Waste Management, Western Boundary, and Southern Boundary Areas

As shown on **Figure 1-2**, groundwater flow in the till/bedrock zone in the northern part of the former Waste Management Area is to the south and southwest toward extraction well 404. Flow in the till/bedrock zone of the Southern Boundary Area is generally to the northeast and north toward extraction well 404. The limits of groundwater capture by extraction well 404 in the till/bedrock zone appear to extend off-Site to the south of the railroad tracks.

An alluvial zone consisting primarily of sand and gravel overlies the till in the Southern Boundary Area. As shown on **Figure 1-3**, horizontal gradients in the alluvial zone of the Southern Boundary

Area are very low (less than 0.01) in the vicinity of the railroad tracks. These low gradients are indicated by groundwater elevations ranging from 801.32 feet to 801.81 feet (a differential of less than 0.5 feet) over an area of several acres at wells 101, 323, 319, 322, 318, 625 and 356. The southern limit of capture by extraction wells 404 and 405 in the alluvial zone is indicated by the groundwater flow divide located north of wells 101 and 323, and passing very close to well 627 on **Figure 1-3**.

3.2.3.2 Tower View Drive and Mirror Lake Areas

The direction of groundwater flow in the till/bedrock zone in the Tower View Drive and Mirror Lake Areas of the Site on November 26, 2018 is shown by the flow arrows on **Figure 1-2**. In these areas, groundwater generally flows to the southwest toward extraction well 404 in the former Waste Management Area. Groundwater flow in the limited alluvial zone through the Tower View Drive Area (**Figure 1-3**) also is generally to the southwest toward extraction well 404 and extraction well 405, which pumps primarily from sand and gravel in the alluvial zone.

3.3 Hydrogeochemistry

This section presents an analysis of the chemical concentration data collected in 2018, including an assessment of trends at specific locations.

3.3.1 Chemicals of Concern

As noted in Section 2.2.3.1.1, the chemicals of concern at the Site include chlorinated ethanes, chlorinated ethenes, and several other CVOCs.

3.3.1.1 Chlorinated Ethanes

The chlorinated ethanes present in groundwater at the Site are 1,1,1-trichloroethane (111-TCA), 1,1-dichloroethane (11-DCA), and chloroethane. 111-TCA is a primary solvent that was used in many industrial applications. 111-TCA degrades to 11-DCA anaerobically by biologically-mediated reductive dechlorination under methanogenic conditions. 111-TCA also degrades to 1,1-dichloroethene (11-DCE, an ethene) by dehydrohalogenation, which is an abiotic elimination reaction common in groundwater. Under conditions favorable to sequential reductive dechlorination, 11-DCE may degrade further to chloroethene (vinyl chloride, VC) and 11-DCA may

degrade to chloroethane (CEA). Biodegradation of 11-DCE to VC requires sulfate-reducing or methanogenic (i.e., anaerobic) conditions that may exist in some areas of the Site. An alternative source of 11-DCA in groundwater is as an impurity in the manufacture of 111-TCA, where 11-DCA was used as an intermediate, rather than from degradation of 111-TCA.

3.3.1.2 Chlorinated Ethenes

The chlorinated ethenes present in groundwater at the Site are trichloroethene (TCE), cis-1,2-dichloroethene (c12-DCE), 11-DCE, and VC. Like 111-TCA, TCE is a primary solvent that was used in various industrial applications. TCE degrades preferentially to c12-DCE or to trans-1,2-dichloroethene under conditions favorable to biologically-mediated reductive dechlorination. As noted in Section 3.3.1.1, 11-DCE (an ethene) is created by abiotic dehydrohalogenation of 111-TCA (an ethane). VC is created by sequential reductive dechlorination of both c12-DCE and 11-DCE.

3.3.1.3 Other Compounds

Other compounds present in groundwater at the Site include methylene chloride (dichloromethane, DCM), Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane), and Freon 123a (1,2-dichloro-1,2,2-trifluoroethane), which is created by the reductive dechlorination of Freon 113 in groundwater. In 2018, Freon 113 and Freon 123a were detected in limited areas of both the alluvial and till/bedrock zones with the highest concentrations in the till/bedrock zone at monitoring well 609 in the central part of the P001 Area and at extraction well 415 in the Tank Farm Area as shown on **Table 2-1**.

In the case of methylene chloride, which degrades both aerobically and anaerobically and is rarely transported beyond the immediate vicinity of a source zone, its distribution is limited to a few wells in the Tank Farm Area and P001 Area, notably wells 610 and 612 with a maximum concentration of 9.3 ug/L.

3.3.1.4 Standardization of Chlorinated Ethane and Ethene Concentrations

As noted above, degradation of 111-TCA and TCE, the principal groundwater contaminants at the Site, can occur biotically or abiotically under either aerobic or anaerobic conditions. Due to the complexity of possible degradation pathways and rates, characterizing the spatial and temporal changes in concentrations of chlorinated ethanes and ethenes is complicated if only individual

chemical species (i.e., 111-TCA, 11-DCA, 11-DCE, etc.) are examined. In an effort to simplify the understanding of chemical degradation and transport, this report presents chemical concentration maps showing a standardized sum of CVOC concentrations for related compounds, adjusted to account for the loss of chlorine ions via mechanisms such as anaerobic biodegradation and abiotic dehydrogenation. This approach is an alternative to preparing separate isoconcentration contour maps and concentration vs. time trend graphs for each chemical species. As explained below, this standardization procedure was performed by expressing the concentrations of CVOCs related through chemical degradation in terms of the parent chemicals 111-TCA and TCE.

The standardized <u>TCA-series concentration</u> was calculated by multiplying concentrations of 11-DCA, 11-DCE, and chloroethane by the ratio of the molecular weight of 111-TCA to the molecular weight of each degradation product, and then summing the products. In this way, all of the dissolved concentrations of 111-TCA, 11-DCA, 11-DCE, and chloroethane in groundwater for a particular sample were expressed as a total TCA-series concentration, thereby approximating the concentration of 111-TCA which theoretically could have been measured if 111-TCA had not been degraded. (Note: Although 11-DCE is an ethene compound, it was included in the TCA-series group of CVOCs because its source at the Site is believed to be primarily from degradation of 111-TCA, an ethane compound).

The same procedure was performed for the ethene compounds such that TCE, c12-DCE, and vinyl chloride concentrations were expressed as a total <u>TCE-series concentration</u>.

The formulas for calculating these series concentrations are shown on **Figures 3-1 through 3-4**, which are sets of isoconcentration contour maps for these standardized TCA-series and TCE-series parameters. The isoconcentration contour limits shown on these maps are based on the NYSGQS, which is 5 ug/L for all of the TCA-series and TCE-series parameters except vinyl chloride, for which the NYSGQS is 2 ug/L. The isoconcentration contour intervals are 5, 50, 500, and 5000 ug/L, in keeping with the order-of-magnitude convention for showing concentrations of CVOC plumes in plan view.

3.3.2 Tank Farm Area and Parking Lot 001 Area

The following discussion focuses on the groundwater chemistry of the alluvial and till/bedrock zones in the Tank Farm Area and Parking Lot 001 Area in the northern part of the Site.

3.3.2.1 Alluvial Zone Chemistry

Figures 3-1 and 3-2 are isoconcentration contour maps showing the distribution of TCA- and TCEseries parameters in the alluvial zone, which includes sand and gravel units of glacial origin, as well as the geologically-more recent alluvium. These figures do not show isoconcentration contours east of the P001 Area and in the Tank Farm Area because the alluvial zone is generally absent or not well-defined in those areas. (As noted in Section 3.2.1, fill and till lie directly on top of bedrock in most of the Tank Farm Area.) Figures 3-1 and 3-2 show plumes of both TCA- and TCE-series parameters centered on an area of concentrations typically less than 500 ug/L in the vicinity of extraction well 414 and monitoring wells 325 and 613. These same constituents are present in on-Site wells 398, 602, 603, and 608 in the extreme western portion of the P001 Area north of Building 352 and southwest of the Moore Tire property. The TCA- and TCE-series plumes east of the groundwater flow divide shown on Figures 3-1 and 3-2 were captured by P001 Area extraction well 414 until August 2018, when well 414 was shut down for reasons explained in Section 2.1. Extraction well 418, the replacement for extraction well 414, was installed in September 2018 and started pumping in November 2018 to maintain hydraulic control in the alluvial zone. groundwater flow divides shown on Figures 3-1 and 3-2 are the same as the divides shown on the groundwater elevation contour map for the alluvial zone (**Figure 1-3**).

3.3.2.2 Till/Bedrock Zone Chemistry

Figures 3-3 and 3-4 are isoconcentration contour maps showing the distribution of TCA- and TCE-series parameters in the till/bedrock zone.

Both of these figures show CVOC plumes originating from the vicinity of the former Tank Farm Area and the northwestern portion of Building 002. Additional groundwater chemistry data obtained from the temporary monitoring wells installed for the 2018 Remedial Alternatives Investigation allowed for the refinement of existing CVOC plume boundaries, particularly in the

area between extraction well 415 and monitoring well 610, and in the areas around monitoring wells 609 and 612.

Both the TCE- and TCA-series CVOC plumes extend off-Site in the till/bedrock interface zone beneath the Moore Tire property. A comparison of **Figures 3-1 and 3-2** shows that the TCA-series plume is generally higher in concentration than the TCE-series plume, although both plumes are similar in lateral extent. Both plumes narrow as they extend off-Site beneath the Moore Tire property and this off-Site extension corresponds roughly with the base of a buried bedrock valley oriented southwest-to-northeast. The leading edges of both plumes in the till/bedrock interface zone appear to attenuate beneath the Moore Tire property.

Plume concentrations greater than 500 ug/L in the Tank Farm Area are captured by extraction well 415. P001 Area extraction wells 413, 414, and 416 intercept groundwater plumes in the till/bedrock zone between the extraction well 415 capture zone and the western groundwater flow divide near Lake View Parkway. These flow divides are identical to those shown on the groundwater elevation contour map for the till/bedrock zone (**Figure 1-2**). Extraction well 417, which began operating in 2019, was installed to more effectively capture the off-Site portion of the plume in the till/bedrock zone west of the P001 Area.

Figure 3-5 shows the distribution of methylene chloride in July 2018 in the till/bedrock zone. Methylene chloride was detected in only two wells shown on **Figure 3-5**. The maximum concentration of methylene chloride detected in 2018 was 9.3 ug/L at monitoring well 612.

3.3.3 Southern Areas

The following discussion focuses on the groundwater chemistry of the alluvial and till/bedrock zones in the southern part of the Site, including the former Waste Management Area, Southern Boundary and Western Boundary Areas, Tower View Drive and Mirror Lake Area. Methylene chloride was not detected in the southern part of the Site and therefore was not contoured separately.

3.3.3.1 Alluvial Zone Chemistry

Figures 3-1 and 3-2 are isoconcentration contour maps showing the distribution of TCA- and TCE-series parameters in November-December 2018 in the alluvial zone of the former Waste Management Area, Southern Boundary and Western Boundary Areas. East of these areas, **Figures 3-1 and 3-2** show the distribution of TCA- and TCE-series parameters in November-December 2018 in the alluvial zone of the Tower View Drive and Mirror Lake Areas.

Figure 3-1 shows a TCA-series plume in the central part of the former Waste Management Area. Several surface impoundments that were used for treating manufacturing process wastes were located in the area and were removed in the late 1980s. South of the Waste Management Area, TCA-series parameters were detected at concentrations less than the NYSGQS in six monitoring wells in the Southern Boundary Area. TCA-series parameters were not detected or were detected only at trace levels (0.1 ug/L) farther south in off-Site wells 540, 541, 542, and 543 located around the Route 17C interchange.

Figure 3-2 shows a TCE-series plume in the central part of the former Waste Management Area where the former surface impoundments were located. In contrast to the TCA-series plume, **Figure 3-2** shows a plume with TCE-series concentrations ranging from 1.7 ug/L at well 101 to 87 ug/L at well 318 in the Southern Boundary Area. The northern part of this plume is captured by extraction well 404. TCE-series parameters were detected off-Site in alluvial zone wells 541, 542, and 543 south of the Southern Boundary Area in the Route 17C interchange at concentrations less than the NYSGQS, as shown on **Figure 3-2**.

Figure 3-1 shows a TCA-series plume with the highest concentrations in the central Tower View Drive and Mirror Lake Areas. TCA-series concentrations at well 621 (160 ug/L, Figure 3-1) on the north side of Tower View Drive and at well 623 on Lake View Parkway (90 ug/L, Figure 3-1), together with groundwater flow directions shown on Figure 1-3, indicate that this plume is captured by extraction wells 404 and 405 in the former Waste Management Area. The southern limit of the TCA-series plume in the Tower View Drive and Mirror Lake Areas lies north of shallow monitoring well 374 on the north side of Mirror Lake (Figure 3-1), where concentrations are typically at or below the limits of detection (0.1 ug/L for individual CVOC species).

Detections of TCE-series constituents in the Tower View Drive and Mirror Lake Areas were limited to two wells, as shown on **Figure 3-2**: well 309 (2.5 ug/L) which monitors the lower part of the till, and well 621 (2.3 ug/L), which is screened in the alluvial zone. These detections are insufficient for inferring a connection to the TCE-series plumes in the former Waste Management Area (**Figure 3-2**).

3.3.3.2 Till/Bedrock Zone Chemistry

Figures 3-3 and 3-4 show the TCA- and TCE-series isoconcentration contours for the till/bedrock zone in the southern areas. With regard to the distribution of TCA-series parameters in the southern part of the Site, Figure 3-3 shows two apparent CVOC plume source areas: (1) off-Site west of Barnes Creek near wells 160 and 162, and (2) on-Site in the northern part of the former Waste Management Area near well 148 east of Building 352 and northeast of Buildings 350/351 (designated "Old WTP" on the maps). The source of the off-Site plume west of Barnes Creek is the former Robintech/Compudyne site at 1200 Taylor Road (NYSDEC Site Code 754007), now owned by Sanmina-SCI. The presence of 111-TCA, TCE and their degradation products at the Sanmina-SCI site is unrelated to the former IBM Owego site and has been attributed to a former chemical storage area located beneath a portion of Sanmina-SCI's main manufacturing building. A third apparent source area lies on-Site to the east in the Tower View Drive and Mirror Lake Areas. Figure 3-3 shows this apparent source area near the southern end of Building 002. The TCA-series plumes in the Tower View Drive and Mirror Lake Areas, and in the former Waste Management Area merge south of the Old WTP, and are ultimately captured by extraction well 404 (Figure 3-3).

The TCE-series isoconcentration contour map for the till/bedrock zone in the western part of the southern areas is shown on **Figure 3-4**. Consistent with the map showing the distribution of TCA-series parameters (**Figure 3-3**), **Figure 3-4** shows a plume with concentrations greater than 100 ug/L being drawn onto the Site from the west at monitoring wells 160 and 162 and a plume centered on the Old WTP. Detections of TCE-series parameters in the Southern Boundary Area south of extraction well 404 were less than the NYSGQS in 2018. Detections of TCE-series parameters in the Tower View Drive and Mirror Lake Areas (**Figure 3-4**) were also less than the NYSGQS, except at well 619 between Buildings 101 and 201, which is the same apparent source area as the TCA-series plume shown on **Figure 3-3** for the till/bedrock zone.

3.3.4 Graphical and Statistical Evaluations

In addition to evaluating the maximum concentrations of individual CVOCs in groundwater relative to groundwater standards (**Table 2-1**), trends in the concentration of CVOCs in groundwater were evaluated graphically using plots of concentration vs. time, and statistically, using non-parametric tests.

3.3.4.1 Concentration vs. Time

Graphs of TCA- and TCE-series concentrations versus time for key monitoring and extraction wells for the years 2000 through 2018 are shown on **Plate 3-1**. The monitoring wells are located near the boundaries of the Site in the P001 Area, Tank Farm Area, Southern Boundary Area, former Waste Management Area, and off-Site in the Moore Tire Area. They represent wells that are sampled quarterly in accordance with the sampling plan presented in **Appendix D**.

3.3.4.2 Statistical Tests for Trend

Concentration trends in many of the wells shown on **Plate 3-1** are apparent by inspection of the concentration vs. time graphs. To determine whether the observed graphical trends in chemical concentrations over time are statistically significant, groundwater analytical chemistry data was evaluated using a non-parametric statistical test, as specified in Section 7.3.3 of the Groundwater Monitoring Plan. This statistical test for trend, the Mann-Kendall test, is based on the concept that a lack of trend should correspond to a time-series plot fluctuating randomly about a constant mean level, without a visually apparent upward or downward pattern. If an increasing trend really exists, then the sample taken first from any randomly selected pair of measurements should have a lower concentration, on average, than the measurement collected at a later time. The Mann-Kendall test does not require that the data be normally distributed and is valid even where data are missing, tied, or censored at the reporting limit (e.g., "not detected at limit X").

ProUCL version 5.1, a statistical software package, was used to identify statistically significant trends at a significance level of $\alpha = 0.05$, which corresponds to a confidence limit of 95%. ProUCL was created for USEPA to address statistical issues described in various CERCLA and RCRA guidance documents. The period used for trend analysis was 11 years (as many as 44 quarterly samples) from January 2008 to October 2018. This period was chosen because a change in

analytical laboratory occurred at the beginning of 2008 and the reporting limit in undiluted samples was lowered to 0.5 ug/L.

The test results for concentration trends at 19 wells are summarized on **Table 3-1** and the ProUCL output is shown in **Appendix I**. The TCA-series and TCE-series trends were tested separately for each well. As shown on **Table 3-1**, the concentration trend in 16 of the 38 tests is indeterminate, meaning that a statistically increasing or decreasing trend could not be confirmed.

In the P001 Area, concentrations of TCE-series parameters are increasing over the 11-year test period at till/bedrock monitoring well 393 near Lake View Parkway and at extraction well 413.

In the Tank Farm Area, concentrations of both TCA-series and TCE-series parameters are decreasing at extraction well 415 (based on nearly ten years of data since the well began pumping in March 2009).

In the off-Site Moore Tire Area, concentrations of TCA- and TCE-series parameters are indeterminate at alluvial zone monitoring wells 529 and 534, and are increasing at till/bedrock zone monitoring well 522. Since most of the detections at wells 529 and 534 are less than 1 ug/L, and there are many non-detects, the results reported by the Mann-Kendall test are not meaningful for assessing concentration trends in these wells.

In the Southern Boundary Area, concentrations of both TCA- and TCE-series parameters in the alluvial zone are decreasing at monitoring wells 625 and 322 near the Site's southern property boundary; these trends continue to be confirmed by inspection of the corresponding concentration vs. time graphs on **Plate 3-1**. The TCA-series trend at well 319 is also decreasing. At well 323 farther north of the southern property boundary, the concentration vs. time graph exhibits apparent seasonality, and concentrations of TCA-series and TCE-series parameters are indeterminate over the 11-year period of the statistical test. Concentrations of TCE-series parameters are increasing at well 318 north of well 625 and are also increasing at well 319 northwest of well 625.

In the Waste Management Area, the long-term trends in both TCA-series and TCE-series concentrations are decreasing at extraction wells 404 and 405, and are apparent by inspection of the concentration vs. time graphs.

Table 3-1. Statistical Evaluation of Trends in Water Quality at Quarterly Monitoring Wells (2008-2018)

at quarterly morntoning trong (2000 2010)						
Site Area	Well	TCA-Series Trend	TCE-Series Trend	Hydrogeologic Zone Monitored		
	393	None	Increasing	Till/Bedrock		
P001 Area	399	None**	None**	Alluvial		
(Monitoring)	606	Decreasing	Decreasing	Alluvial		
	607	None	Decreasing	Till/Bedrock		
	413	None	Increasing	Till/Bedrock		
P001 Area (Extraction)	414/418	Decreasing	None⁺	Alluvial & Till/Bedrock		
,	416^	None	None	Till/Bedrock		
Tank Farm Area (Extraction)	415*	Decreasing	Decreasing	Till/Bedrock		
	522	Increasing	Increasing	Till/Bedrock		
Moore Tire Area	529	None**	None**	Alluvial		
(Off-Site Monitoring)	532	None	Decreasing	Alluvial		
	534	None***	None***	Alluvial		
	318	None	Increasing	Alluvial		
Southern	319	Decreasing	Increasing	Alluvial		
Boundary Area	322	Decreasing	Decreasing	Alluvial		
(Monitoring)	323	None	None	Alluvial		
	625	Decreasing	Decreasing	Alluvial		
Waste Management	404	Decreasing	Decreasing	Alluvial & Till/Bedrock		
Area (Extraction)	405	Decreasing	Decreasing	Alluvial		

The Mann-Kendall test was used to evaluate concentration trends at a significance level of $\alpha = 0.05$.

[&]quot;None" means that the concentration trend is indeterminate.

⁺ Well 418 replaced well 414 in 2018. A significant decrease in concentration occurred in the first quarter of 2016.

[^] Thirteen quarters of data was available for extraction well 416, which replaced extraction well 412 in mid-2015.

^{*} Nearly ten years of data (39 quarters) from 2009-2018 was available for extraction well 415.

^{**} The Mann-Kendall test result is not meaningful because most detections are less than 1 ug/L and there are many non-detects relative to the number of detections.

^{***} A low-level increasing trend is apparent by inspection since 2016 at well 534.

3.3.5 CVOC Mass Removal

Table A-2 in **Appendix A** shows the dissolved mass of CVOCs pumped by the groundwater extraction wells during 2018 and subsequently removed via the Site's packed-column air stripping tower. The total CVOC mass removed was calculated by multiplying the GTF influent concentrations from monthly NPDES compliance sampling by the volume of groundwater pumped monthly through the air stripping tower. Based on these calculations, the total CVOC mass removed from groundwater in 2018 was 328 pounds, with 157 pounds (48 percent) of this total CVOC mass consisting of TCE. The cumulative total CVOC mass removed since 1998 is approximately 7,483 pounds.

3.3.6 Maps of Total CVOCs, 111-TCA, and TCE

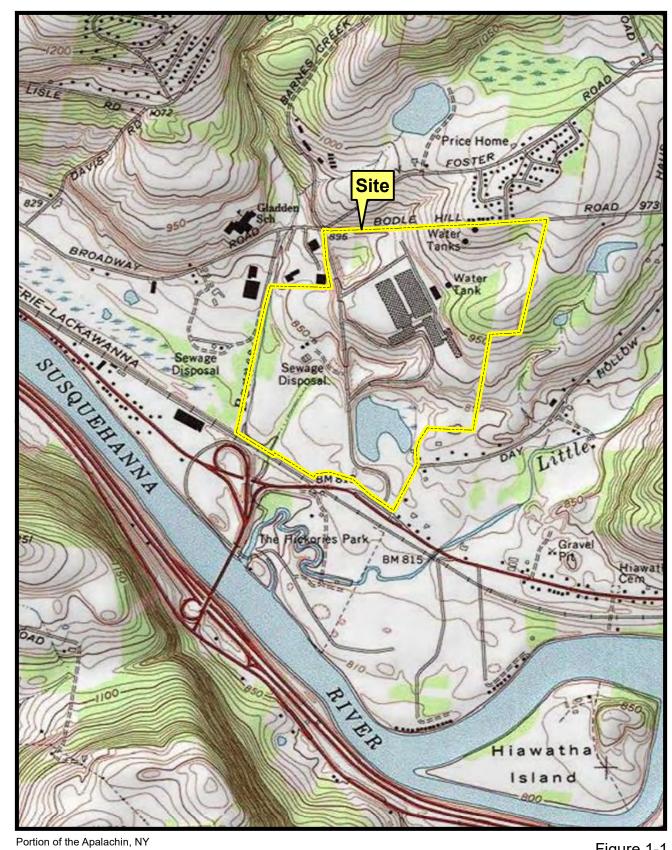
As required by the GMP, **Figure 3-6** shows the total concentration in groundwater for the 17 CVOCs on the Site's parameter list, as specified on Table 1-1 of the GMP and Module II, Table II-3 of the Part 373 Permit. The total CVOC concentration is shown for all wells, regardless of hydrogeologic zone, and CVOC isoconcentration contours are shown for wells in the bedrock and till/bedrock zone, where the CVOC plumes are most extensive relative to the plumes in the alluvial zone. The total CVOC value posted at each well has been rounded to two significant figures (or to one significant figure if less than 1 ug/L).

As required by the GMP, **Figures 3-7 and 3-8** show the distribution of 111-TCA and TCE, respectively, and not the sum of their transformation series component CVOCs. As with **Figure 3-6**, concentrations of 111-TCA (**Figure 3-7**) and TCE (**Figure 3-8**) are shown for all wells, regardless of hydrogeologic zone, and isoconcentration contours at the limit of the NYSGQS (5 ug/L) are shown only for wells in the bedrock and till/bedrock zone, where the 111-TCA and TCE plumes are more extensive relative to the plumes in the alluvial zone. The plumes limits for 111-TCA on **Figure 3-7** and for TCE on **Figure 3-8** are similar to the plume limits shown on the TCA-and TCE-series isoconcentration maps for the till bedrock zone (**Figures 3-3 and 3-4**) because 111-TCA and TCE are significant contributors to the total CVOC concentration at most of the monitoring wells.

4 VAPOR INTRUSION ASSESSMENT

SHPC prepared a report summarizing the status of vapor intrusion (VI) assessment and mitigation-related work at the Site for the calendar year 2018. The report, presented in **Appendix L**, addresses the following items:

- 1. The status of the buildings that were the focus of the RFI Work Plan.
- 2. The status of heating, ventilating, and air conditioning (HVAC) operations and occupancy for B001, B002, and B351.
- 3. The results of indoor air sampling performed in B001.
- 4. Sub-slab depressurization (SSD) system operation and performance.
- 5. Activities planned for 2019.



USGS 7.5-Minute Quadrangle
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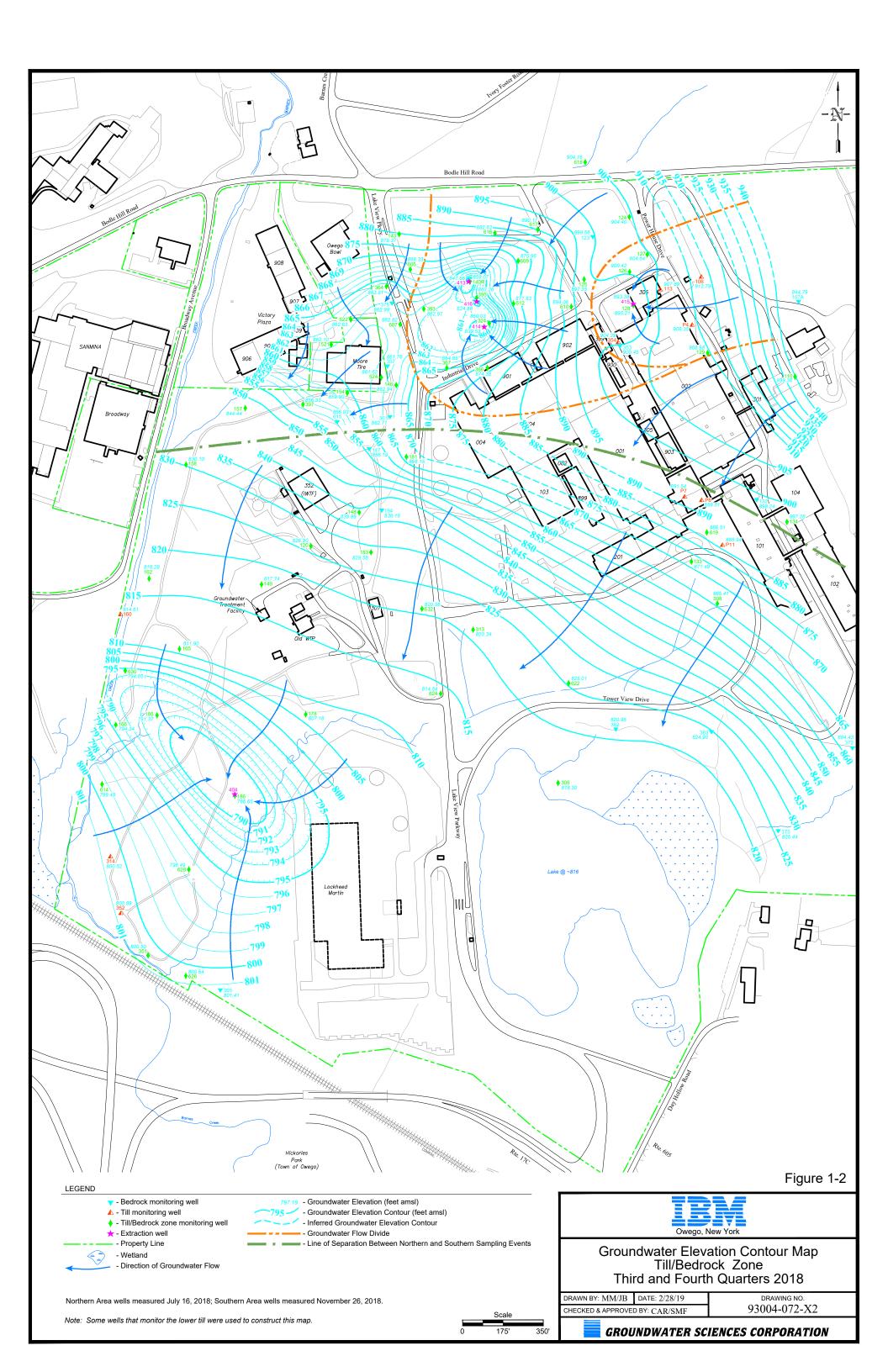
Figure 1-1

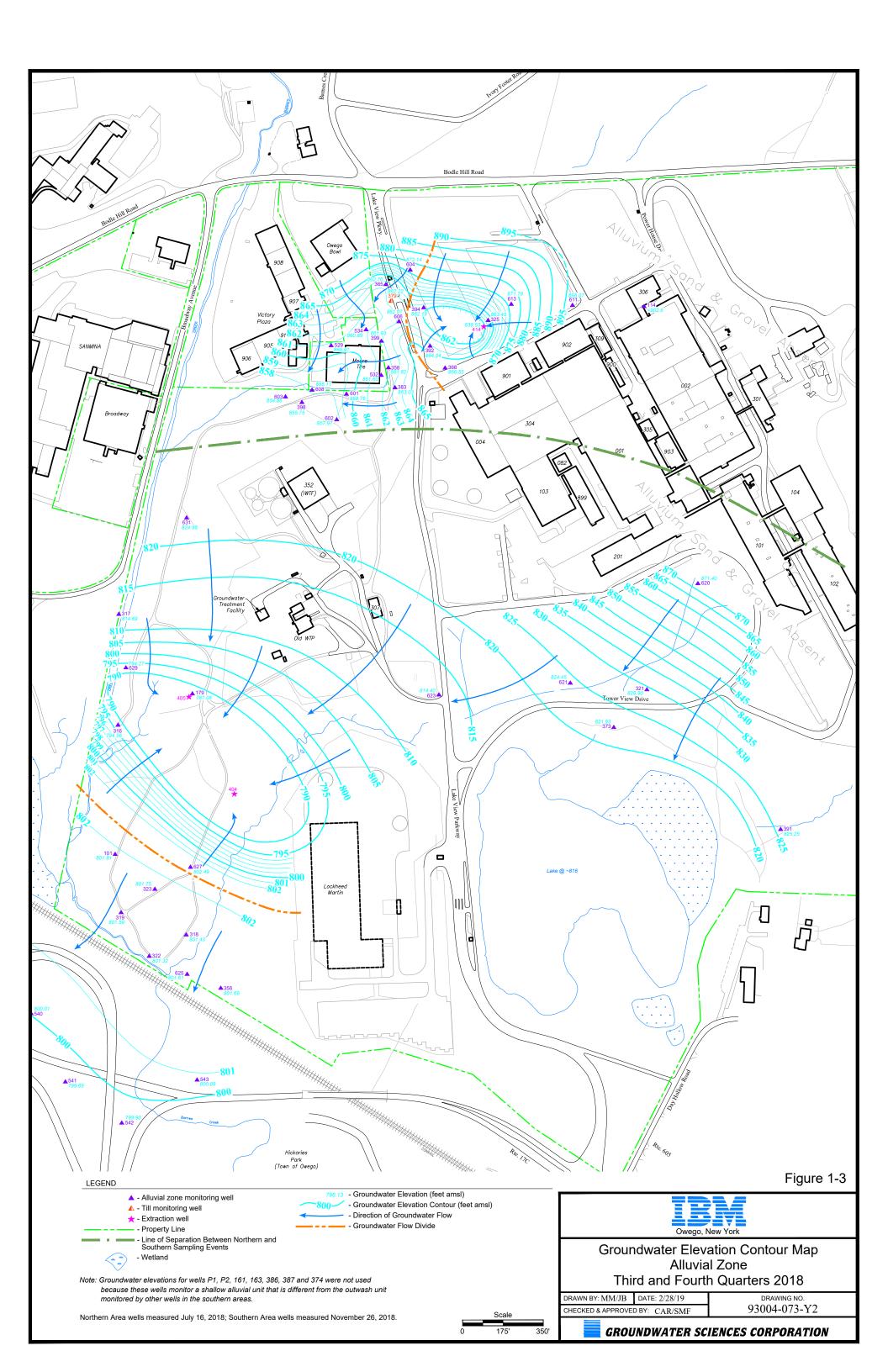


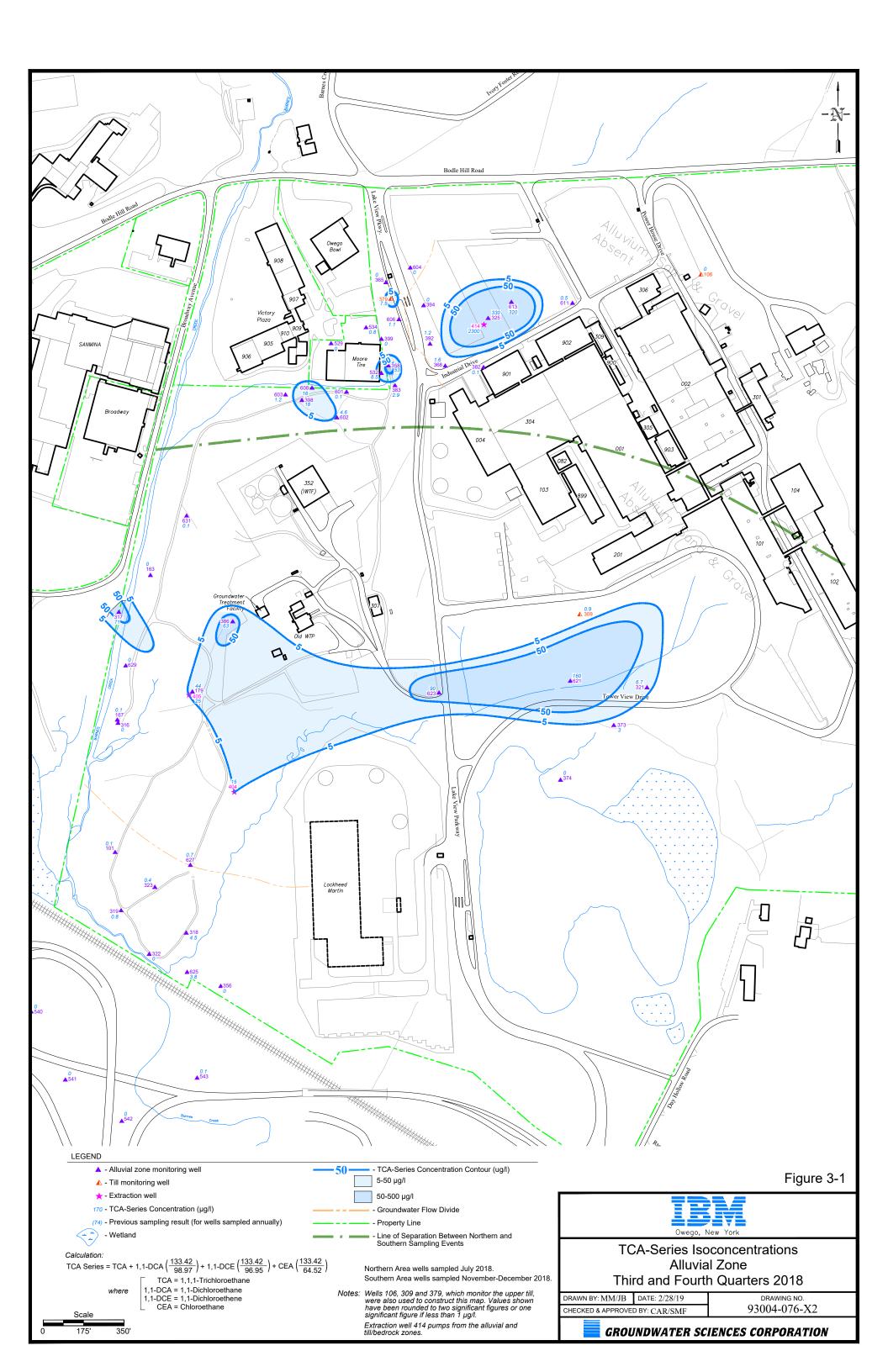
Site Location Map

Scale (feet) 0 5001,000 2,000

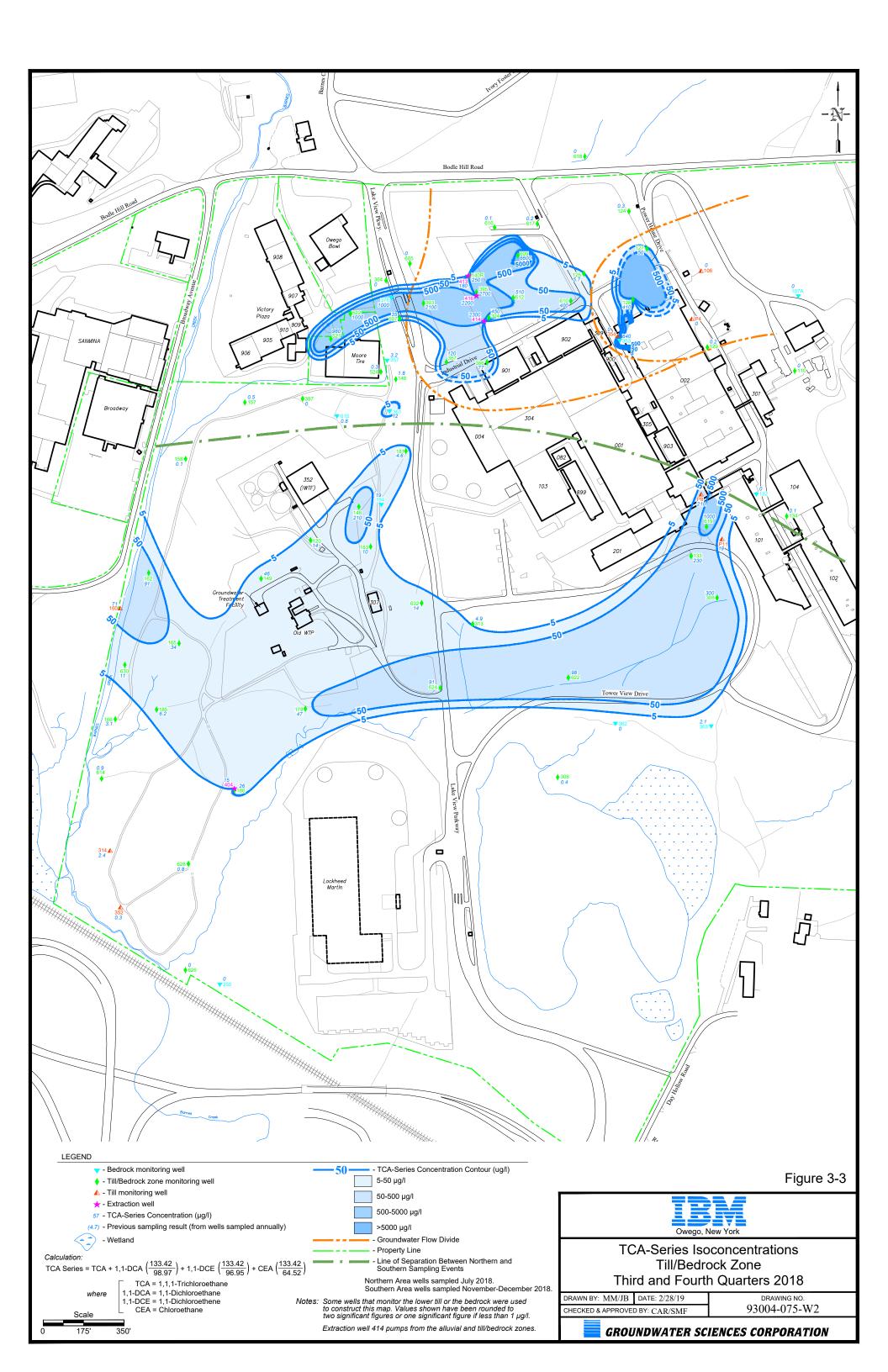
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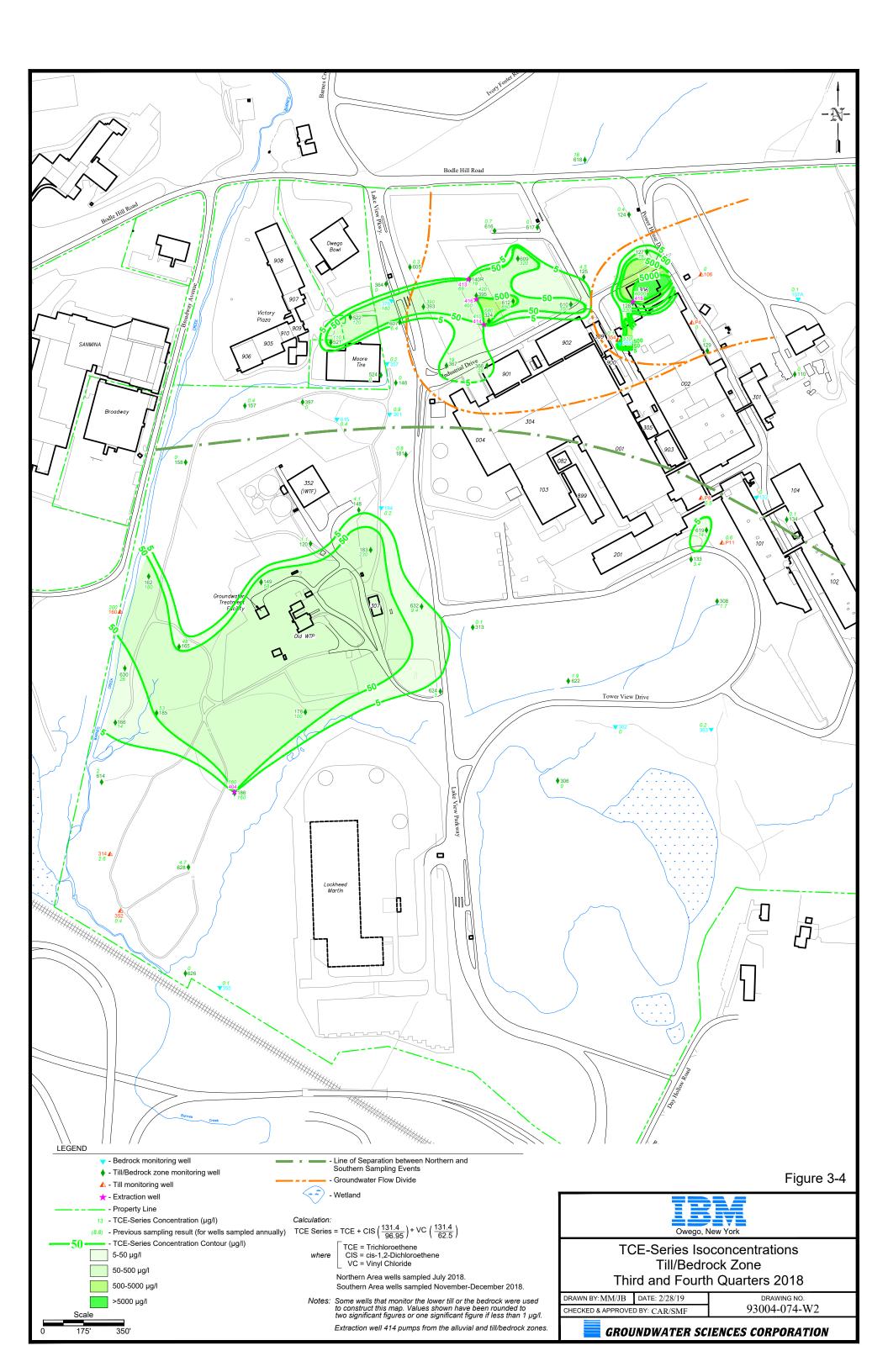


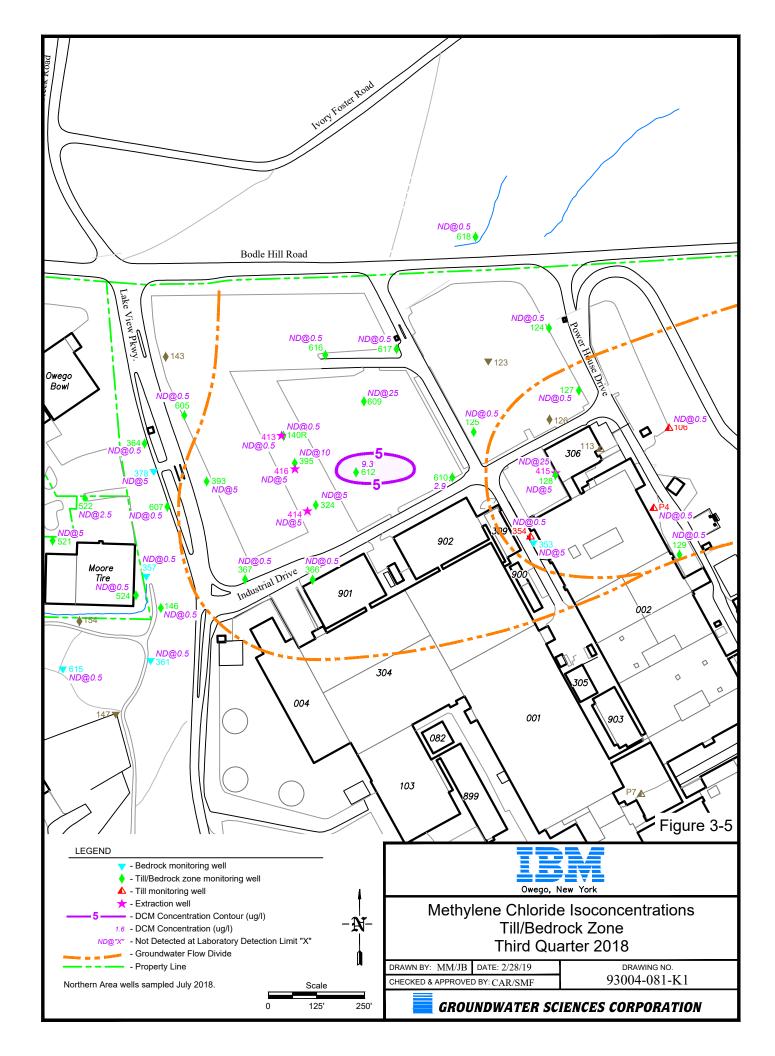


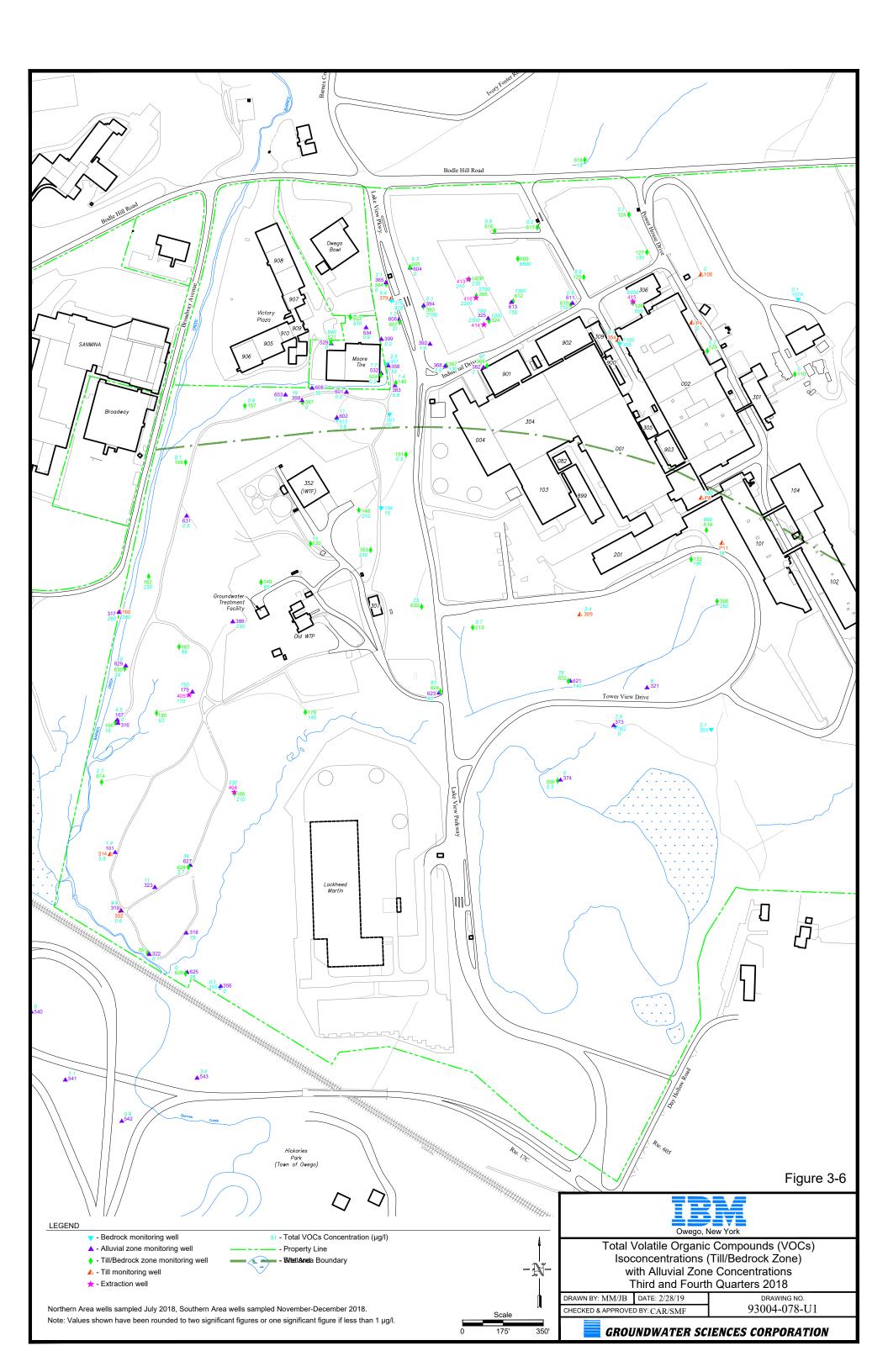


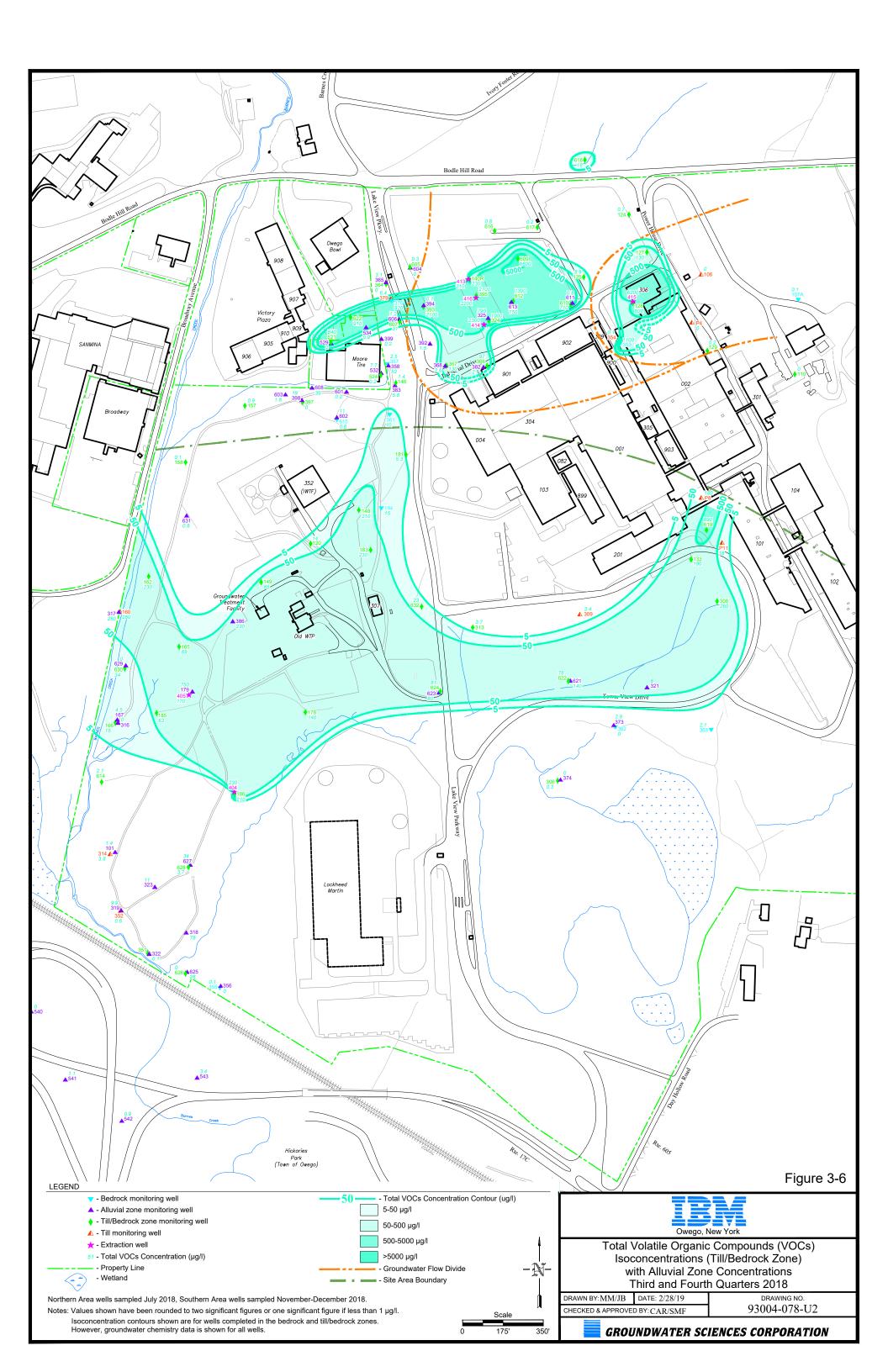


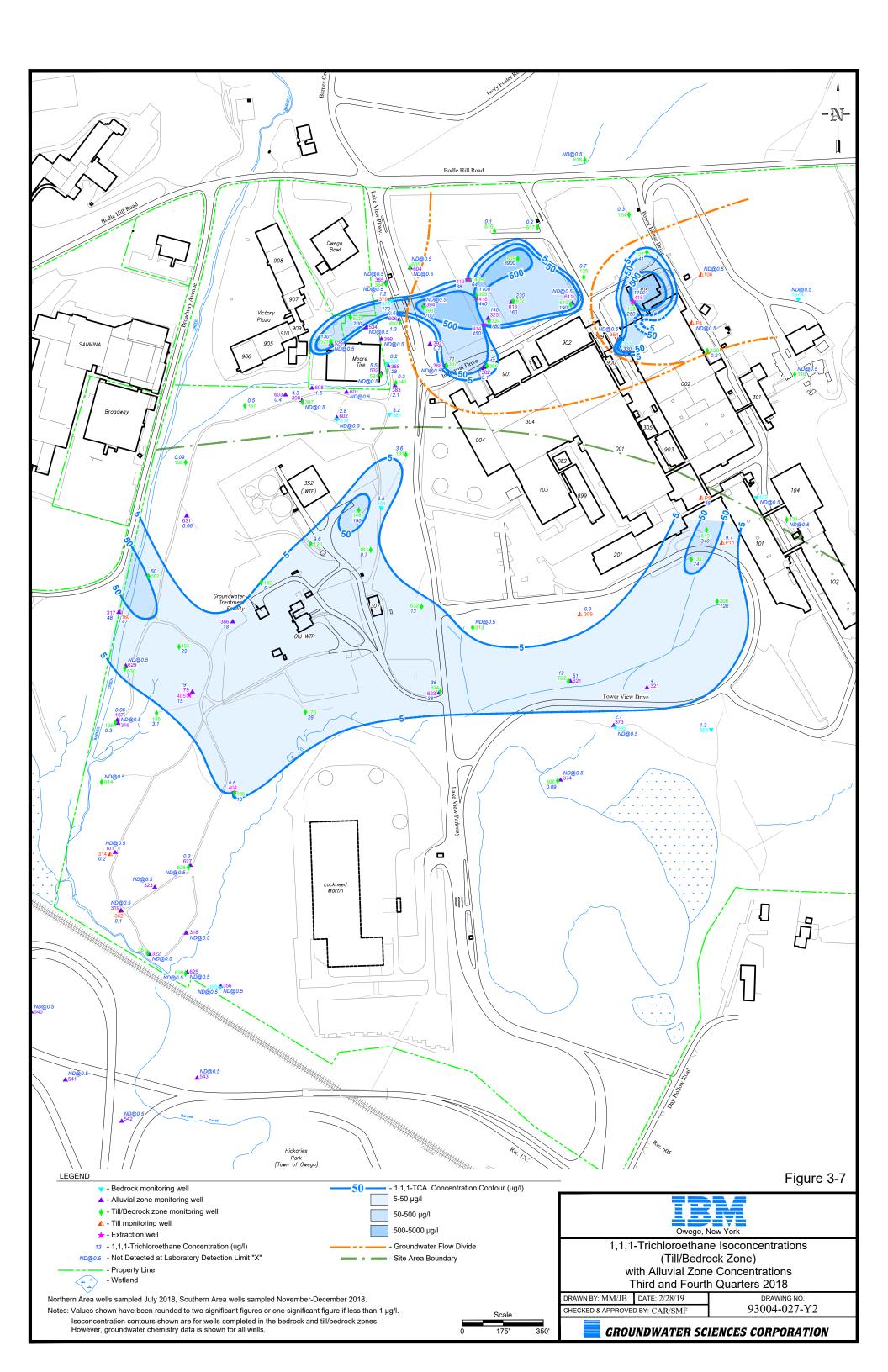


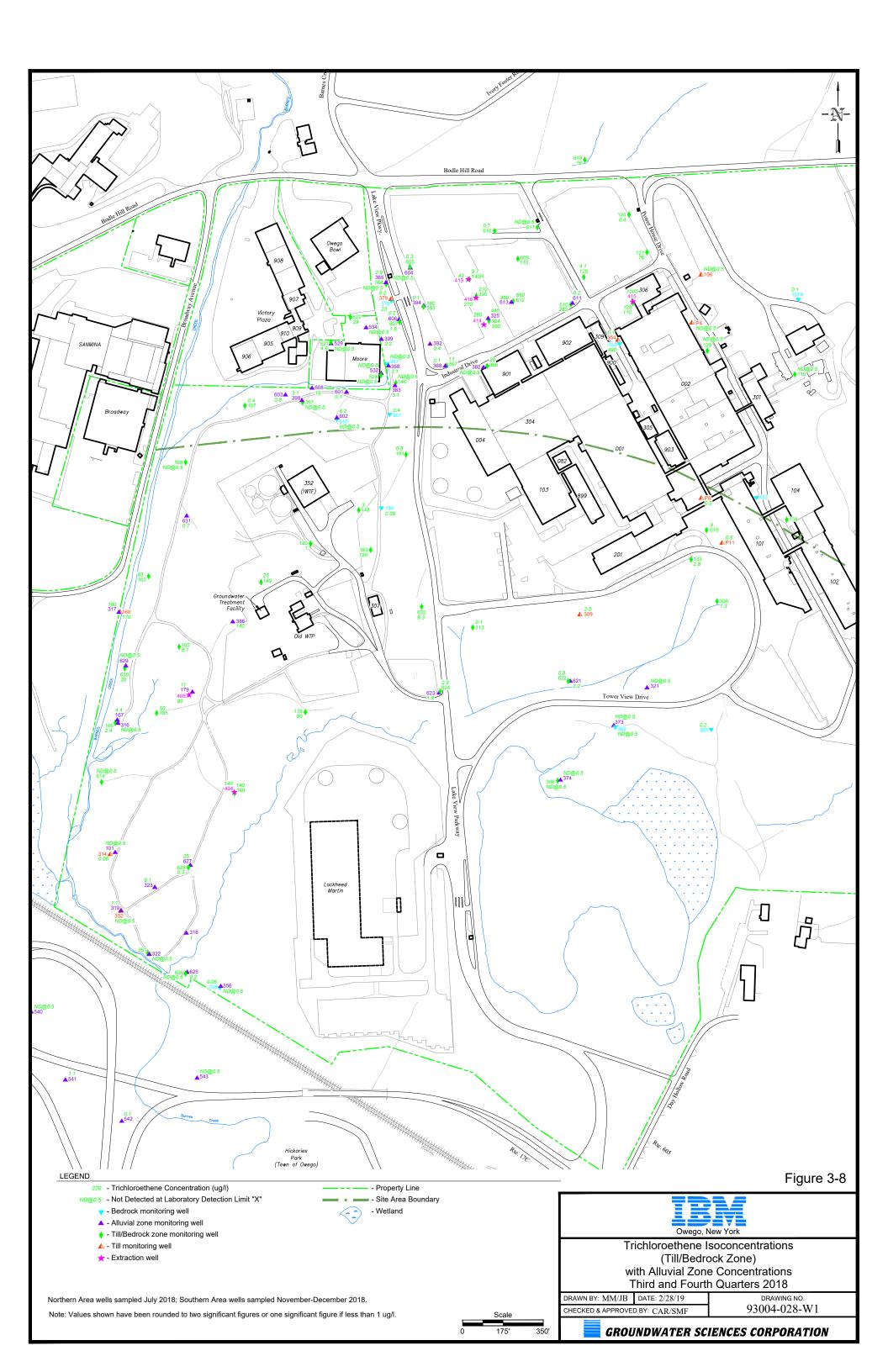


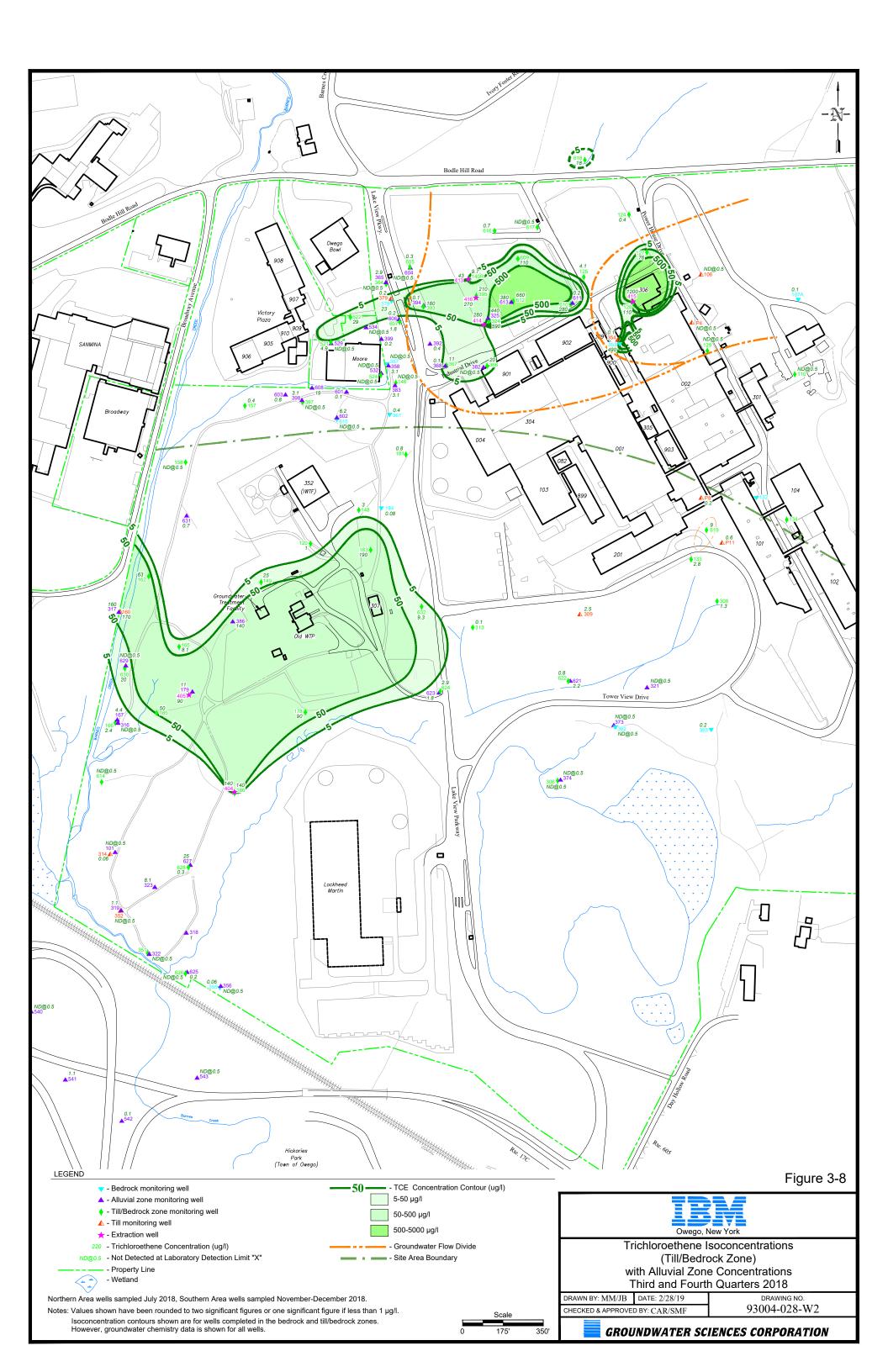


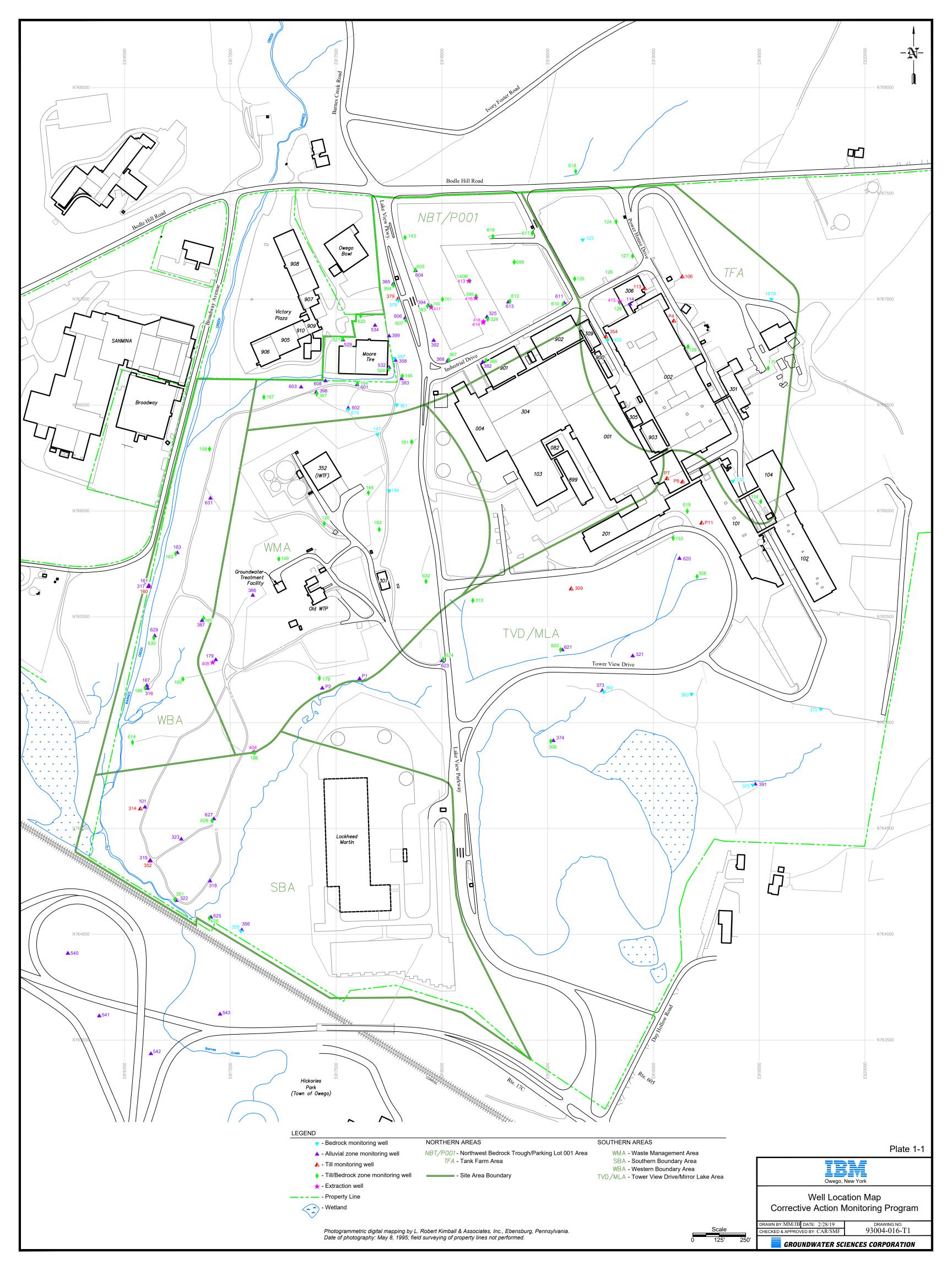


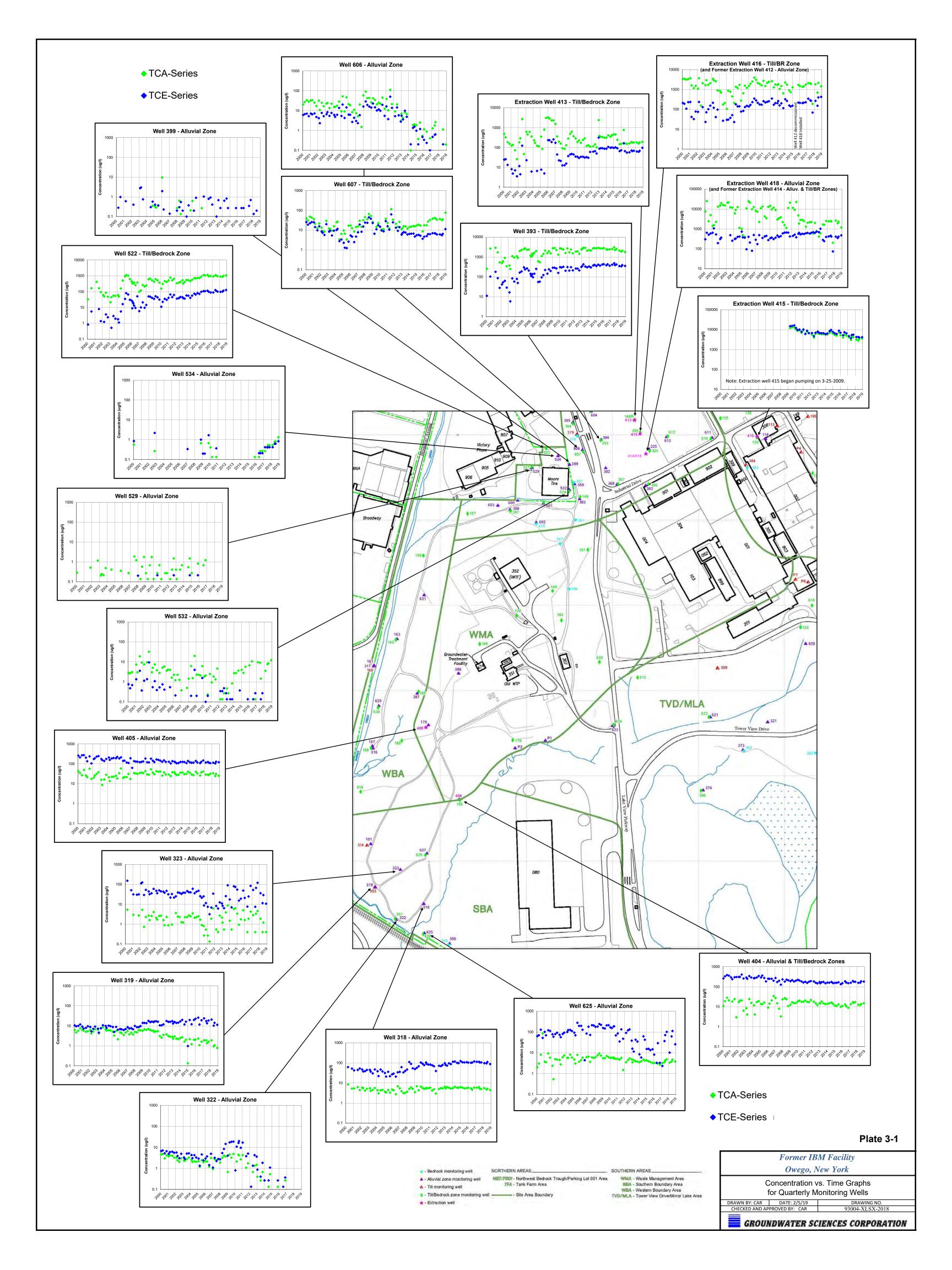












APPENDIX A

Table A-1: Extraction Well Pumping Volumes Table A-2: CVOC Mass Removal Calculations

January 2018 – December 2018

Table A-1: 2018 Extraction Well Pumping Volumes (gallons) Former IBM Facility, Owego, New York

Month	Waste Mar Are	•	Park	ing Lot 001 A	irea	Tank Farm Area	Site Total
	404	405	414/418	413	416	415	
Jan-18	4,645,000	6,777,000	82,100	171,600	18,400	26,600	11,720,700
Feb-18	4,325,000	6,268,000	68,100	158,400	11,200	28,400	10,859,100
Mar-18	5,162,000	6,998,000	122,200	190,800	14,400	55,300	12,542,700
Apr-18	4,915,000	6,754,000	85,000	164,400	18,400	46,100	11,982,900
May-18	4,834,000	6,850,000	112,100	206,500	22,500	44,600	12,069,700
Jun-18	4,504,000	6,720,000	119,600	189,800	14,500	38,000	11,585,900
Jul-18	4,668,000	6,947,000	60,600	202,900	22,500	47,500	11,948,500
Aug-18	5,198,000	7,023,000	4,500	235,500	24,000	46,500	12,531,500
Sep-18	5,288,000	6,745,000	0	244,900	22,200	34,300	12,334,400
Oct-18	5,525,000	7,014,000	0	252,900	18,500	25,100	12,835,500
Nov-18	5,073,000	6,761,000	52,400	220,700	6,300	26,300	12,139,700
Dec-18	5,111,000	6,903,000	104,800	213,600	28,900	51,700	12,413,000
	*Flows in italics	r	Total	144,963,600			

readings based on the results of a meter calibration test on 12/6/2018.

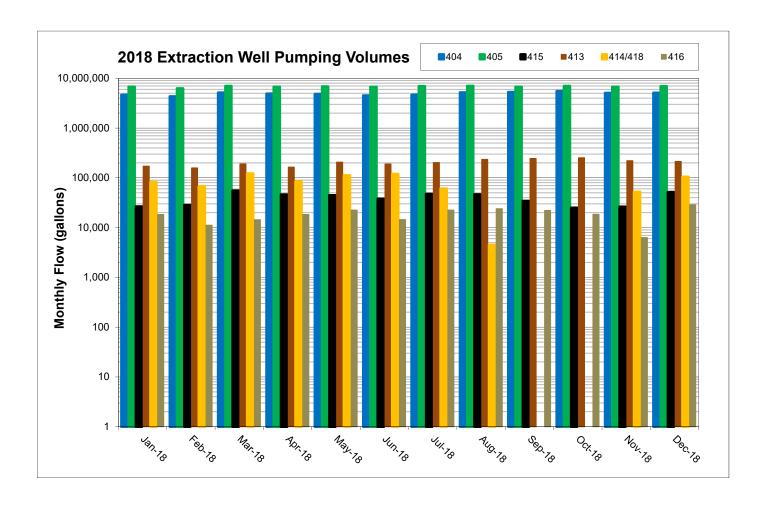


Table A-2: 2018 CVOC Mass Removal Calculations Former IBM Facility, Owego, New York

Concentrations of CVOCs in Air Stripper Influent (ug/L)

Month	Trichloroethene	cis-1,2- Dichloroethene	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1,2-Trichloro-1,2,2- Trifluoroethane (Freon 113)	1,2-Dichloro-1,2,2- Trifluoroethane (Freon 123a)	Other VOCs	Volume Pumped through GTF* (gallons)
Jan	140.0	39.0	34.0	36.0	10.0	69.0	5.0	1.2	10,921,300
Feb	150.0	33.0	35.0	37.0	9.0	51.0	5.0	0.7	10,159,100
Mar	120.0	36.0	29.0	32.0	9.0	43.0	3.0	1.2	11,653,800
Apr	130.0	33.0	26.0	27.0	7.0	41.0	4.0	1.0	11,281,900
May	120.0	32.0	23.0	26.0	6.0	37.0	4.0	0.0	11,374,900
Jun	130.0	28.0	25.0	28.0	8.0	45.0	4.0	0.0	10,961,600
Jul	140.0	36.0	33.0	35.0	13.0	47.0	5.0	0.6	11,348,800
Aug	130.0	33.0	26.0	27.0	8.0	45.0	4.0	0.0	11,900,300
Sep	140.0	41.0	18.0	14.0	6.0	38.0	4.0	1.4	11,675,700
Oct	160.0	43.0	23.0	15.0	8.0	48.0	6.0	2.1	12,079,100
Nov	140.0	50.0	20.0	18.0	7.0	39.0	5.0	1.8	11,397,300
Dec	150.0	50.0	24.0	25.0	9.0	47.0	6.0	2.1	11,613,600
								Total	420 207 400

 $^{{}^{\}star}\text{The volume}$ pumped through the GTF includes flows from the powerhouse sump, and

Total 136,367,400

differs from the sum of the extraction well volumes due to metering differences.

gallons

Pounds of CVOCs Removed by Air Stripping

Month	Trichloroethene	cis-1,2- Dichloroethene	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,1,2-Trichloro-1,2,2- Trifluoroethane (Freon 113)	1,2-Dichloro-1,2,2- Trifluoroethane (Freon 123a)	Other VOCs	Total VOCs Removed (pounds)
Jan	12.8	3.6	3.1	3.3	0.9	6.3	0.5	0.1	30.5
Feb	12.7	2.8	3.0	3.1	8.0	4.3	0.4	0.1	27.2
Mar	11.7	3.5	2.8	3.1	0.9	4.2	0.3	0.1	26.6
Apr	12.2	3.1	2.4	2.5	0.7	3.9	0.4	0.1	25.3
May	11.4	3.0	2.2	2.5	0.6	3.5	0.4	0.0	23.6
Jun	11.9	2.6	2.3	2.6	0.7	4.1	0.4	0.0	24.5
Jul	13.3	3.4	3.1	3.3	1.2	4.5	0.5	0.1	29.3
Aug	12.9	3.3	2.6	2.7	8.0	4.5	0.4	0.0	27.1
Sep	13.6	4.0	1.8	1.4	0.6	3.7	0.4	0.1	25.6
Oct	16.1	4.3	2.3	1.5	0.8	4.8	0.6	0.2	30.8
Nov	13.3	4.8	1.9	1.7	0.7	3.7	0.5	0.2	26.7
Dec	14.5	4.8	2.3	2.4	0.9	4.6	0.6	0.2	30.4
Totals	156.6	43.2	29.8	30.1	9.5	52.0	5.2	1.2	328

pounds

APPENDIX B

Table B-1: Well Specifications, Corrective Action Monitoring

Program

Table B-2a: Hydraulic Effectiveness Monitoring Wells for

Groundwater Elevation Measurements

Table B-2b: Contaminant Reduction Monitoring Wells for

Groundwater Sampling

Table B-1: Well Specifications Corrective Action Monitoring Program

Well	Northing	Easting	Current M.P. Elevation	Current Ground Surface Elevation	Depth to Bedrock	Bedrock Elevation	Screened Depth	Interval	Baseline Depth to Bottom from M.P.	Baseline Elevation of Bottom	Well Diameter	Screen Length	Well Construction Material	Geologic Unit Monitored	Site Area	Up, Down, or Side Gradient
	(grid feet)	(grid feet)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft	bgs)	(ft)	(ft amsl)	(in)	(ft)				
101	764601.1	916596.6	814.01	811.2	NE	NE	30	- 40	41.0	773.1	6	10	S, 25-slot	Outwash Sand	SBA	DG
106	767106.1	919136.5	914.91	912.9	11.6	901.2	6.3	- 11.6	13.1	901.8	4	5.3	PVC	Till*	TFA	UG
107A	767000.3 766674.6	919557.6	961.80	960.3	NL 15.5	NL 024.2	NL 14.2	- NL	65.0	896.8	2	NL	PVC	Bedrock	TFA	UG
110 113	767051.4	919542.5 918957.9	946.88 914.83	947.9 912.1	15.5 25	931.3 887.0	14.3	- 19.6 - 10.2	20.1 12.7	926.8 902.1	4	5.3	PVC PVC	Till/Bedrock Till	TFA TFA	UG DG
114	766976.5	918889.9	916.13	913.4	22	891.6	9.4	- 14.7	16.7	899.5	4	5.3	PVC	Fill	TFA	DG
120	765939.9	917443.6	846.20	844.7	24	820.7	20	- 25	39.6	806.6	6	5	OH	Till/Bedrock	WMA	DG
123	765871.9	919093.3	903.96	904.5	18	886.0	19	- 23	21.9	882.1	4	4	PVC	Bedrock	TFA	DG
124	767366.9	918823.9	911.43	908.5	20	888.4	19	- 23	25.1	886.3	4	4	PVC	Till/Bedrock	TFA	SG
125	767096.6	918627.9	905.36	905.7	24	881.3	22	- 26	24.9	880.5	4	4	PVC	S & G/Bedrock	TFA	DG
126	767128.9	918825.2	908.95	909.4	22	886.9	21	- 25	23.9	885.1	4	4	PVC	Till/Bedrock	TFA	DG
127 128	767204.2 766984.2	918901.6	909.65	909.8 912.5	18 22	891.2 890.5	17 20	- 21 - 24	19.5 24.9	890.1 889.4	2	4	PVC PVC, 10-slot	S & G/Bedrock	TFA TFA	DG DG
129	766776.9	918840.7 919163.6	914.23 912.10	912.5	7.5	906.4	6	- 10	8.4	903.8	4	4	PVC, 10-SIOI	Till/Bedrock Till/Bedrock	TFA	DG
132	766141.1	919376.3	915.31	912.0	14	898.1	14	- 18	21.2	894.1	4	4	PVC	Bedrock	TFA	DG
133	767281.5	918665.9	897.22	894.3	26	867.5	24	- 28	31.5	865.7	4	4	PVC	Till/Bedrock	TVD/MLA	DG
134	766044.5	919507.4	916.46	913.9	36	876.5	35	- 39	42.9	873.6	4	4	PVC	Till/Bedrock	TFA	DG
140R	767086.4	918134.6	889.17	886.9	41.5	845.5	38	- 43	45.1	844.0	2	5	PVC, 20-slot	Till/Bedrock	NBT/P001	DG
143	767292.3	917826.1	884.81	885.5	19.5	866.5	17	- 21	29.1	855.8	4	4	PVC	Till/Bedrock	NBT/P001	DG
146	766637.9	917813.3	868.04	865.6	22	843.6	20	- 24	25.9	842.2	4	4	PVC	Till/Bedrock	NBT/P001	DG
147	766361.6	917695.9	871.57	868.9	20	848.5	20	- 24 - 34	27.3	844.3	4	5	PVC PVC	Bedrock	WMA	DG
148 149	766085.9 765773.6	917652.8 917229.3	857.87 834.27	854.6 831.6	32 29	823.1 802.5	29	- 34	34.9 33.6	823.0 800.7	4	4	PVC	Till/Bedrock Till/Bedrock	WMA WMA	DG DG
154	766603.6	917601.3	861.70	860.2	21	839.2	14	- 24	25.6	836.1	2	10	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
157	766538.0	917158.9	854.13	852.7	16	836.6	9	- 19	20.0	834.1	4	10	PVC	Till/Bedrock	NBT/P001	DG
158	766293.2	916902.0	838.28	836.2	37	799.1	28	- 38	39.8	798.5	4	10	PVC	Till/Bedrock	WBA	SG
160	765642.6	916618.6	824.31	821.6	60	761.4	49.5	- 59.5	58.5	765.9	4	10	PVC	Basal Till	WBA	SG
161	765648.6	916615.3	824.96	821.8	NE	NE	10	- 20	22.7	802.2	4	10	PVC	Alluvial silt and gravel	WBA	SG
162	765798.6	916741.9	825.50	823.7	47	776.5	39	- 49	50.4	775.1	4	10	PVC	Till/Bedrock	WBA	SG
163 165	765802.6 765493.3	916749.6 916873.7	825.40 817.50	823.8 815.6	NE 40	NE 775.4	15 31	- 25 - 41	25.5 44.2	799.9 773.3	4	10	PVC PVC	Alluvial silt and gravel Till/Bedrock	WBA WBA	SG
166	765164.2	916597.5	813.71	812.0	87	724.5	78	- 88	90.6	723.2	4	10	PVC	Till/Bedrock	WBA	SG
167	765175.2	916605.7	813.26	811.7	NE	NE	14	- 24	25.5	787.7	4	10	PVC	Silt	WBA	SG
178	765209.7	917421.0	812.22	809.2	32	776.8	30	- 35	36.4	775.8	4	5	PVC, 10-slot	Gravel/Bedrock	WMA	DG
179	765297.4	916931.4	818.32	815.6	NE	NE	66	- 70	71.5	746.8	4	4	PVC, 8-slot	Outwash Sand	WMA	DG
181	766327.2	917857.1	894.65	893.2	37	855.7	34	- 39	40.6	854.1	4	5	PVC	Till/Bedrock	WMA	DG
183	765912.9	917704.1	851.83	848.9	25	823.9	22	- 27	30.5	821.3	4	5	PVC	Till/Bedrock	WMA	DG
185 186	765206.1	916776.3	815.54	813.0	89 92	723.9	71	- 91 - 94	94.2	721.3	4	20 30	PVC PVC	S & G/Bedrock	WBA SBA	DG
194	764857.7 766096.0	917114.0 917750.2	820.32 862.70	817.8 861.4	36	725.9 824.3	64 48	- 110	96.3 113.4	724.1 749.3	5	62	S/OH	S & G/Bedrock Bedrock	WMA	DG DG
306	764912.6	918514.9	821.04	817.8	58	760.1	40	- 60	62.5	758.5	4	20	PVC	S & G/Bedrock	TVD/MLA	
308	765690.7	919205.9	876.26	873.1	25	847.9	17	- 27	30.0	846.3	4	10	PVC	Till/Bedrock	TVD/MLA	
309	765632.1	918611.4	874.69	872.4	27	845.1	22	- 27	32.2	842.5	4	5	PVC	Till	TVD/MLA	DG
313	765577.1	918146.7	849.79	847.3	35	812.0	31	- 35	39.5	810.3	4	4	PVC	Till/Bedrock*	TVD/MLA	_
314	764592.4	916575.0	813.82	811.1	98	713.0	93	- 98	100.4	713.4	4	5	PVC	Basal Till	SBA	DG
316	765161.3	916608.8 916612.3	813.46	812.0	NE NE	NE NE	38	- 48 45	49.0	764.5	4	10	PVC	Glaciolac., vf sand, silt, clay	WBA	DG
317 318	765642.2 764251.6	916904.6	823.00 814.19	820.6 811.9	NE NE	NE NE	35 36	- 45 - 46	47.2 47.3	775.8 766.9	4	10	PVC PVC	Outwash S & G Outwash S & G	WBA SBA	DG DG
319	764348.5	916622.4	806.89	804.3	NE NE	NE	33	- 43	45.2	761.7	4	10	PVC	Outwash Sand	SBA	DG
321	765315.2	918902.2	853.72	852.1	NE	NE	29	- 39	39.6	814.2	4	10	PVC	S & G/Till	TVD/MLA	DG
322	764159.2	916744.3	806.20	803.8	NE	NE	34	- 44	45.7	760.5	4	10	PVC	Outwash S & G	SBA	DG
323	764450.0	916768.0	813.67	811.6	NE	NE	35	- 45	47.3	766.3	4	10	PVC	Outwash Sand	SBA	DG
324	766906.2	918216.7	892.60	890.8	50.0	840.8	41.5	- 51.5	53.4	839.2	2	10	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
325	766916.7	918213.5	892.08	890.6	NE 86	NE 719.1	35	- 40	42.5	849.5	2	5	PVC, 10-slot	Alluvial Gravel	NBT/P001	_
351 352	764164.5 764346.6	916737.6 916619.9	805.62 806.48	804.1 804.6	86 84.8	718.1 719.8	83.5	- 88.5 - 85	90.4 87.4	715.2 719.1	2	5	PVC PVC	Till/Bedrock Basal Till	SBA SBA	DG DG
353	766807.8	918783.5	912.87	913.3	23	890.3	24	- 29	28.6	884.3	2	5	PVC	Bedrock	TFA	DG
354	766823.0	918775.7	912.85	913.4	NE	NE	13	- 18	17.3	895.6	2	5	PVC	Till	TFA	DG
355	764015.2	917050.3	813.42	811.3	89.5	721.8	90.5	95.5	97.9	715.5	2	5	PVC	Bedrock	SBA	DG
356	764020.7	917054.5	813.31	811.5	NE	NE	63.2	- 68.2	70.3	743.0	2	5	PVC	Outwash S & G	SBA	DG
357	766720.9	917775.4	863.89	862.0	24.5	837.3	27.5	- 32.5	34.5	829.4	2	5	PVC	Bedrock	NBT/P001	_
358	766711.3	917781.0	864.08	861.8	NE	NE	9.5	- 14.5	17.6	846.4	2	5	PVC	Alluvial S & G	NBT/P001	_
361	766501.5	917786.6	868.42	865.8	28	837.8	28	- 33	35.4	833.0	2	5	PVC	Bedrock	NBT/P001	DG

Table B-1: Well Specifications Corrective Action Monitoring Program

				- E			ء	:	Τ_							
Well	Northing	Easting	Current M.P. Elevation	Current Ground Surface Elevation	Depth to Bedrock	Bedrock Elevation	though Donors	Interval	Baseline Depth to Bottom from M.P.	Baseline Elevation of Bottom	Well Diameter	Screen Length	Well Construction Material	Geologic Unit Monitored	Site Area	Up, Down, or Side Gradient
	(grid feet)	(grid feet)	(ft amsl)	(ft amsl)	(ft bgs)	(ft amsl)	(ft	bgs)	(ft)	(ft amsl)	(in)	(ft)				
363	765135.4	919180.1	855.07	852.5	38.5	814.0	38.5	- 43.5		809.5	2	5	PVC	Bedrock	TVD/MLA	DG
364 365	767066.3 767072.2	917771.0 917770.3	897.68 898.00	896.0 896.2	60.5 NE	835.5 NE	58.5 39	- 63.5 - 44	65.2 45.8	832.5 852.2	2	5	PVC PVC	Till/Bedrock Alluvial S & G	NBT/P001 NBT/P001	SG SG
366	766711.7	918208.6	912.48	910.7	37.2	873.5	36	- 41	43.0	869.5	2	5	PVC	Till/Bedrock	NBT/P001	DG
367	766712.8	918032.6	910.08	908.3	67	841.9	66	- 71	72.5	837.6	2	5	PVC	Till/Bedrock	NBT/P001	DG
368	766710.2	918027.1	910.15	908.1	NE	NE	42.5	- 47.5	49.3	860.8	2	5	PVC	Alluvial f. Sand, Slt, G	NBT/P001	DG
372 373	765064.9 765151.7	919791.2 918758.2	904.96 832.19	903.5 829.5	58 NE	845.5 NE	58.5 33	- 63.5 - 43	65.8 45.7	839.1 786.5	2	5 10	PVC PVC	Bedrock Outwash S & G	TVD/MLA TVD/MLA	SG
374	764914.9	918527.1	821.25	818.6	NE NE	NE	8	- 18	20.5	800.7	2	10	PVC	Sand & Gravel	TVD/MLA	DG
375	764705.6	919469.4	833.00	831.4	38	793.4	38.5	- 43.5	_	787.4	2	5	PVC	Bedrock	TVD/MLA	SG
378	766993.8	917794.6	900.02	898.0	65.5	832.5	69.5	- 74.5	77.2	822.8	2	5	PVC	Bedrock	NBT/P001	DG
379 382	767000.4 766704.2	917792.4 918193.3	899.66 912.59	897.9 910.4	NE NE	NE NE	45 15	- 50 - 20	51.9 22.6	847.8 890.0	2	5	PVC PVC	Till Fill	NBT/P001 NBT/P001	DG DG
383	766625.0	917810.0	867.39	864.6	NE NE	NE	9	- 14	17.0	850.4	2	5	PVC	Alluvial Slt & f. Sand	NBT/P001	DG
386	765601.5	917106.5	822.26	819.4	NE	NE	9.5	- 14.5	17.5	804.8	2	5	PVC	Alluvial S & G	WMA	DG
387	765481.8	916866.0	817.59	815.1	NE	NE	7.5	- 12.5		802.1	2	5	PVC	Alluvial S&G & Silt	WBA	DG
391	764709.2	919481.7	833.75	831.5	NE	NE	18	- 28	30.2	803.6	2	10	PVC PVC, 10-slot	Outwash S & G	TVD/MLA	SG
392 393	766805.5 766967.9	917961.4 917932.7	895.98 892.55	893.8 890.4	NE 59	NE 831.5	33 58	- 43 - 63	45.0 65.1	851.0 827.5	2	10 5	PVC, 10-slot	Alluvial S&G & Silt Till/Bedrock	NBT/P001 NBT/P001	DG DG
394	766972.3	917934.2	892.29	890.3	NE	NE	35	- 45	46.8	845.5	2	10	PVC, 10-slot	Alluvial S&G & Silt	NBT/P001	DG
395	767015.6	918162.0	890.04	887.7	59.5	828.6	57.5	- 62.5	65.1	825.0	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
397	766554.2	917409.1	865.79	863.6	34	829.6	32.5	- 37.5	_	826.1	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
398 399	766561.0 766826.6	917406.4 917750.8	865.37 867.33	863.3 865.6	NE NE	NE NE	6 4	- 16 - 14	18.1 16.5	847.3 850.8	2	10	PVC, 10-slot PVC, 10-slot	Alluvial S&G & Silt Alluvial S&G & Silt	NBT/P001 NBT/P001	DG DG
404	764862.8	917113.2	NA	NA	92	725.8	37	- 42	NA	NA	10	5	S, 6-slot	Alluvial Zone	WMA	DG
							55	- 65				10	S, 6-slot	Alluvial Zone / Till		
							87	- 92				5	S, 10-slot	Till/Bedrock Zone		
405	765284.0	916916.7	NA	NA	86.5	728.5	53 82	- 63 - 87	NA	NA	10	10 5	S, 8-slot S, 10-slot	Alluvial Zone Till	WMA	DG
413	767086.5	918127.5	889.16	886.7	28.5	843.6	24	- 34	NA	NA	6	10	S, 60-slot	Till/Bedrock Zone	NBT/P001	DG
414	766889.8	918195.1	893.11	891.0	50	841.3	37	- 57	NA	NA	6	20	S, 20-slot	Alluvial & Till/Bedrock Zones	NBT/P001	DG
415	766989.0	918841.0	914.38	912.0	25	887.5	23	- 28	35.4	879.0	6	5	SS, 35-slot	Till/Bedrock Zone	TFA	DG
416 417	767004.4 766961.7	918161.1 917949.3	890.58 891.78	888.1 889.4	59 63	829.1 826.4	53.5 58	- 63.5 - 64	71.0 71.4	819.6 820.4	6 8	10 6	SS, 50-slot SS, 20-slot	Till/Bedrock Zone Till/Bedrock Zone	NBT/P001 NBT/P001	DG DG
417	766895.7	918199.0	893.21	891.0	NE	020.4 NE	34	- 39	46.2	847.0	8	5	SS, 20-slot	Alluvial Zone	NBT/P001	DG
521	766813.4	917531.5	863.78	861.6	36	825.6	33.5	- 38.5	41.1	822.7	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
522	766922.5	917616.3	864.46	862.3	28	834.3	26.5	- 31.5		830.4	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
524 529	766671.0	917748.5	866.28	864.1	31 NE	833.1 NE	28.5	- 33.5		830.1	2	5	PVC, 10-slot	Till/Bedrock All. Silt. Sand. Gravel	NBT/P001 NBT/P001	DG DG
532	766807.5 766678.4	917532.6 917750.1	863.93 866.34	861.8 864.0	NE NE	NE NE	6	- 12.5 - 14	14.9 16.6	849.0 849.8	2	6.5 8	PVC, 10-slot PVC, 10-slot	All. Silt, Sand, Gravel	NBT/P001	DG
534	766876.5	917684.3	862.88	863.4	NE	NE	4	- 14	13.3	849.5	2	10		All. Silt, Sand, Gravel	NBT/P001	DG
540	763910.4	916233.3	810.55	808.2	>52	<756.2	39	- 49	51.1	759.5	2	10	PVC, 10-slot	Outwash Sand	SBA	DG
541	753614.5	916380.7	812.11	809.6	>56	<753.6	42.5	- 52.5		757.0	2	10		Outwash S & G	SBA	DG
542 543	763435.0 763621.1	916624.5 916951.9	806.40 823.64	804.0 820.6	>80 >56	<724.0 <764.6	32 41	- 42 - 51	44.7 54.3	761.8 769.3	2	10	PVC, 10-slot PVC, 10-slot	Outwash S & G Outwash S & G	SBA SBA	DG DG
601	766597.3	917599.5	862.08	860.0	NE	NE	3	- 13	15.6	846.5	2	10	PVC, 10-slot	Alluvial S&G/Silt	NBT/P001	DG
602	766485.9	917557.5	862.15	860.1	NE	NE	5	- 17	19.5	842.6	2	12	PVC, 10-slot	Alluvial Silt & Sand	NBT/P001	DG
603	766585.3	917334.9	864.18	861.9	NE	NE	5.75	- 15.75	_	846.2	2	10		Alluvial S&G	NBT/P001	_
604	767135.5	917876.0	885.48	885.8	NE 45.5	NE 942.0	14 43	- 24 - 48	21.9 45.7	863.6	2	10 5	PVC, 10-slot PVC, 10-slot	Alluvial Silt & Sand Till/Bedrock	NBT/P001	DG DG
605 606	767139.6 766911.5	917874.6 917826.6	885.23 900.06	900.6 900.6	45.5 NE	842.0 NE	43	- 48	47.4	839.5 852.7	2	5	PVC, 10-slot	Alluvial S&G and Silt	NBT/P001 NBT/P001	DG
607	766901.8	917830.3	900.46	900.9	58	842.9	55.5	- 60.5	_	840.4	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
608	766614.6	917449.8	861.51	859.1	NE	NE	4	- 14	16.8	844.7	2	10	PVC, 10-slot	All. Silt, Sand, Gravel	NBT/P001	DG
609	767176.0	918342.1	895.16	895.5	49.5	846.0	47	- 52	51.7	843.5	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
610 611	766978.1 766982.3	918572.3 918579.3	909.10	909.7 909.7	30.5 NE	879.2 NE	28 4	- 33 - 14	32.4 13.4	876.7 895.7	2	5 10	PVC, 10-slot PVC, 10-slot	Till/Bedrock Fill/All. Sand & Silt	NBT/P001 NBT/P001	DG DG
612	766991.4	918321.7	903.93	904.5	56.1	848.4	54	- 59	56.6	847.3	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
613	766986.7	918314.2	903.94	904.5	NE	NE	32	- 42	41.6	862.3	2	10	PVC, 10-slot	All. Sand, Silt, Gravel	NBT/P001	DG
614	764906.7	916538.0	811.80	809.2	101	708.2	97.5	- 102.5	_	706.4	2	5	PVC, 10-slot	Till/Bedrock	WBA	DG
615 616	766479.4 767296.7	917558.0 918241.6	862.69 888.18	860.5 885.2	26.5	827.5 858.7	38 23.5	- 43 - 28.5	46.1	816.6 856.6	2	5	PVC, 10-slot PVC, 10-slot	Bedrock Till/Bedrock	NBT/P001 NBT/P001	DG DG
617	767312.2	918427.0	895.77	896.1	35	861.1	32.5	- 28.5 - 37.5	_	858.4	2	5	PVC, 10-slot	Till/Bedrock	NBT/P001	DG
618	767604.5	918632.7	909.29	906.2	24	879.4	21	- 26	28.9	880.4	2	5	PVC, 10-slot	Till/Bedrock	TFA	UG
619	765999.4	919160.0	896.45	896.8	13.5	883.3	10	- 15	15.1	881.4	2	5	PVC, 10-slot	Till/Bedrock	TVD/MLA	DG

Table B-1: Well Specifications **Corrective Action Monitoring Program**

Well	Northing	Easting	(Is am B.) Current M.P. Elevation	by Current Ground Surface Elevation	(sed th)	(Isame th)		Scre	(sb)	Baseline Depth to Bottom from M.P.	Baseline Elevation of Bottom	j Well Diameter	(t) Screen Length	Well Construction Material	Geologic Unit Monitored	Site Area	Up, Down, or Side Gradient
620	765775.4	919122.9	887.16	884.2	NE	NE	4.5	-	14.5	17.6	869.6	2	10	PVC, 10-slot	All. Sand, Silt, Gravel	TVD/MLA	DG
621	765343.7	918569.7	841.97	840.0	NE	NE	25	-	35	37.4	804.6	2	10	PVC, 10-slot	Outwash Silt&Gravel	TVD/MLA	DG
622	765344.6	918560.8	842.11	840.0	42	798.0	39	-	44	46.5	795.6	2	5	PVC, 10-slot	Till/Bedrock	TVD/MLA	DG
623	765292.6	918000.3	852.67	850.7	NE	NE	42	-	52	54.6	798.1	2	10	PVC, 10-slot	Outwash Sand&Gravel	TVD/MLA	DG
624	765299.7	918006.4	853.46	851.5	60.5	791.0	52	-	57	64.4	789.1	2	5	PVC, 10-slot	Till/Bedrock	TVD/MLA	DG
625	764081.1	916908.4	808.77	806.8	NE	NE	32	-	42	44.6	764.2	2	10	PVC, 10-slot	Outwash Sand	SBA	DG
626	764076.2	916901.0	808.60	804.5	86.5	718.0	84.5	-	89.5	92.4	716.2	2	5	PVC, 10-slot	Till/Bedrock	SBA	DG
627	764545.6	916922.9	812.96	811.2	NE	NE	38	-	48	50.9	762.1	2	10	PVC, 10-slot	Outwash Sand	SBA	DG
628	764537.3	916914.3	812.43	810.9	95.5	715.4	93	-	98	100.5	711.9	2	5	PVC, 10-slot	Till/Bedrock	SBA	DG
629	765410.2	916642.9	818.39	816.2	NE	NE	38	-	48	51.4	766.9	2	10	PVC, 10-slot	Silt, f. Sand, Gravel	WBA	SG
630	765399.8	916638.6	817.63	815.5	88	727.5	85.5	-	90.5	93.6	724.1	2	5	PVC, 10-slot	Till/Bedrock	WBA	SG
631	766060.3	916906.3	829.38	828.0	NE	NE	24	-	29	31.5	797.9	2	5	PVC, 10-slot	Outwash Sand&Gravel	WBA	UG
632	765667.6	917925.0	853.24	850.8	34	816.8	31	-	36	39.3	813.9	2	5	PVC, 10-slot	Till/Bedrock	WMA	DG
700	766967.5	917950.5	889.06	889.3	63	826.3	57	-	67	66.8	822.3	2	10	PVC, 20-slot	Till/Bedrock	NBT/P001	DG
701	767000.2	918002.8	888.24	888.7	62.5	826.2	60	-	65	64.5	823.7	2	5	PVC, 20-slot	Till/Bedrock	NBT/P001	DG
P01	765207.2	917610.9	810.62	808.7	NE	NE	5	-	10	11.2	799.4	2	5	PVC	S & G	WMA	DG
P02	765162.9	917434.9	809.61	807.8	NE	NE	5	<u> </u> -	10	10.5	799.1	2	5	PVC	S & G	WMA	DG
P04	766897.6	919096.5	914.73	913.6	19.5	894.1	14	-	19	20.3	894.4	2	5	PVC	Till	TFA	DG
P07	766152.6	919063.9	894.47	895.4	6.5	888.8	NL	-	NL	5.6	888.9	2	NL	S	Till*	TVD/MLA	DG
P08	766137.6	919137.3	894.70	895.3	9.5	886.3	NL	<u> </u> -	NL	8.7	886.0	2	NL	S	Till*	TVD/MLA	DG
P11	765943.1	919227.8	895.21	895.5	15.5	879.5	NL	-	NL	14.8	880.4	2	NL	S	Till*	TVD/MLA	DG

Key:

DG: Downgradient from source area S&G: Sand and Gravel

ft amsl: Feet above mean sea level
ft bgs: Feet below ground surface
Glaciolac.: Glaciolacustrine

NBT/P001: Northwest Bedrock Trough/
Parking Lot 001 Area

M.P.: Measurement point

Sasd. Sarlu and Graver

S,SS: Steel, Stainless Steel

SBA: Southern Boundary Area

SG: Side gradient to source area

TFA: Tank Farm Area

TVD/MLA: Tower View Drive/Mirror Lake Area

UG: Upgradient from source area

M.P.: Measurement point

NE: Not encountered

NL: No log available OH: Open hole completion

PVC: Polyvinyl chloride

UG: Upgradient from source area

NA: Not available or not accessible WBA: Western Boundary Area

WMA: Waste Management Area

* Uncertain

Table B-2a: Hydraulic Effectiveness Monitoring Wells for Groundwater Elevation Measurements

	M.P. Elev.	Planar C	oordinates			
Well	(ft amsl)	Northing	Easting	Site Area	List "A"	List "B"
101	814.01	764601.1	916596.6	SBA	Х	
106	914.91	767106.1	919136.5	TFA		Х
107A	961.80	767000.3	919557.6	TFA		Х
110	946.88	766674.6	919542.5	TFA		Х
113	914.83	767051.4	918957.9	TFA		Х
114	916.13	766976.5	918889.9	TFA		Х
120	846.20	765939.9	917443.6	WMA	X	
123	903.96	765871.9	919093.3	TFA		Х
124	911.43	767366.9	918823.9	TFA		Х
125	905.36	767096.6	918627.9	TFA		Х
126	908.95	767128.9	918825.2	TFA		Х
127	909.65	767204.2	918901.6	TFA		Х
128	914.23	766984.2	918840.7	TFA		Х
129	912.10	766776.9	919163.6	TFA		Х
132	915.31	766141.1	919376.3	TFA		X
133	897.22	767281.5	918665.9	TVD/ML	Х	
134	916.46	766044.5	919507.4	TFA		Х
140R	889.17	767086.4	918134.6	NBT/P001		X
143	884.81	767292.3	917826.1	NBT/P001		X
146	868.04	766637.9	917813.3	NBT/P001		X
147	871.57	766361.6	917695.9	WMA	X	
148	857.87	766085.9	917652.8	WMA	X	
149	834.27	765773.6	917229.3	WMA	X	
154	861.70	766603.6	917601.3	NBT/P001		Х
157	854.13	766538.0	917158.9	NBT/P001		X
158	838.28	766293.2	916902.0	WBA	X	
160	824.31	765642.6	916618.6	WBA	X	
161	824.96	765648.6	916615.3	WBA	X	
162	825.50	765798.6	916741.9	WBA	X	
163	825.40	765802.6	916749.6	WBA	X	
165	817.50	765493.3	916873.7	WBA	X	
166	813.71	765164.2	916597.5	WBA	X	
167	813.26	765175.2	916605.7	WBA	X	
178	812.22	765209.7	917421.0	WMA	X	
179	818.32	765209.7	916931.4	WMA	X	
181	894.65	766327.2	917857.1	WMA	X	
183	851.83	765912.9	917704.1	WMA	X	
185	815.54	765206.1	916776.3	WBA	X	
186	820.32	764857.7	917114.0	SBA	X	
194 306	862.70	766096.0 764912.6	917750.2 918514.9	WMA TVD/ML	X	
	821.04	764912.6 765690.7			X	
308 309	876.26 874.69	765632.1	919205.9 918611.4	TVD/ML TVD/ML	X	
			+	TVD/ML TVD/ML		
313 314	849.79 813.82	765577.1	918146.7	·	X	
		764592.4	916575.0	SBA		
316 317	813.46	765161.3	916608.8	WBA	X	
	823.00	765642.2 764251.6	916612.3	WBA	X	
318	814.19	764251.6	916904.6	SBA		
319	806.89	764348.5	916622.4	SBA	X	
321	853.72	765315.2	918902.2	TVD/ML	X	
322	806.20	764159.2	916744.3	SBA	X	
323	813.67	764450.0	916768.0	SBA NRT/D004	X	
324	892.60	766906.2	918216.7	NBT/P001		X
325	892.08	766916.7	918213.5	NBT/P001		Х
351	805.62	764164.5	916737.6	SBA	X	
352	806.48	764346.6	916619.9	SBA	X	
353	912.87	766807.8	918783.5	TFA		X
354	912.85	766823.0	918775.7	TFA		Х
355	813.42	764015.2	917050.3	SBA	X	
356	813.31	764020.7	917054.5	SBA	X	
357	863.89	766720.9	917775.4	NBT/P001		X
358	864.08	766711.3	917781.0	NBT/P001		X

Table B-2a: Hydraulic Effectiveness Monitoring Wells for Groundwater Elevation Measurements

	M.P. Elev.	Planar C	oordinates			
Well	(ft amsl)	Northing	Easting	Site Area	List "A"	List "B"
361	868.42	766501.5	917786.6	NBT/P001		Х
362	832.69	765146.5	918765.3	TVD/ML	Х	
363	855.07	765135.4	919180.1	TVD/ML	Х	
364	897.68	767066.3	917771.0	NBT/P001		Х
365	898.00	767072.2	917770.3	NBT/P001		Х
366	912.48	766711.7	918208.6	NBT/P001		Х
367	910.08	766712.8	918032.6	NBT/P001		Х
368	910.15	766710.2	918027.1	NBT/P001		Х
372	904.96	765064.9	919791.2	TVD/ML	Х	
373	832.19	765151.7	918758.2	TVD/ML	Х	
374	821.25	764914.9	918527.1	TVD/ML	Х	
375	833.00	764705.6	919469.4	TVD/ML	Х	
378	900.02	766993.8	917794.6	NBT/P001		Х
379	899.66	767000.4	917792.4	NBT/P001		Х
382	912.59	766704.2	918193.3	NBT/P001		Х
383	867.39	766625.0	917810.0	NBT/P001		X
386	822.26	765601.5	917106.5	WMA	Х	
387	817.59	765481.8	916866.0	WBA	X	
391	833.75	764709.2	919481.7	TVD/ML	X	
392	895.98	766805.5	917961.4	NBT/P001		Х
393	892.55	766967.9	917932.7	NBT/P001		X
394	892.29	766972.3	917934.2	NBT/P001		X
395	890.04	767015.6	918162.0	NBT/P001		X
397	865.79	766554.2	917409.1	NBT/P001		X
398	865.37	766561.0	917406.4	NBT/P001		X
399	867.33	766826.6	917750.8	NBT/P001		X
413	889.16	767086.5	918127.5	NBT/P001		X
415	914.38	766989.0	918841.0	TFA		X
416	890.58	767004.4	918161.1	NBT/P001		X
417	891.78	767004.4	917949.3	NBT/P001		X
418	893.21	766895.7	918199.0	NBT/P001		X
521	863.78	766813.4	917531.5	MT		X
521	864.46	766922.5	917616.3	MT		X
524 529	866.28 863.93	766671.0	917748.5	MT MT		X
		766807.5	917532.6	MT		X
532	866.34 862.88	766678.4	917750.1	MT		X
534		766876.5	917684.3	SBA	V	^
540	810.55	763910.4	916233.3		X	
541	812.11	753614.5	916380.7	SBA	X	
542	806.40	763435.0	916624.5	SBA	X	
543	823.64	763621.1	916951.9	SBA NRT/D004	X	· · · · · · · · · · · · · · · · · · ·
601	862.08	766597.3	917599.5	NBT/P001		X
602	862.15	766485.9	917557.5	NBT/P001		X
603	864.18	766585.3	917334.9	NBT/P001		X
604	885.48	767135.5	917876.0	NBT/P001		X
605	885.23	767139.6	917874.6	NBT/P001		X
606	900.06	766911.5	917826.6	NBT/P001		X
607	900.46	766901.8	917830.3	NBT/P001		X
608	861.51	766614.6	917449.8	NBT/P001		X
609	895.16	767176.0	918342.1	NBT/P001		X
610	909.10	766978.1	918572.3	NBT/P001		X
611	909.11	766982.3	918579.3	NBT/P001		X
612	903.93	766991.4	918321.7	NBT/P001		X
613	903.94	766986.7	918314.2	NBT/P001		Х
614	811.80	764906.7	916538.0	WBA	X	
615	862.69	766479.4	917558.0	NBT/P001		X
616	888.18	767296.7	918241.6	NBT/P001		X
617	895.77	767312.2	918427.0	NBT/P001		Х
618	909.29	767604.5	918632.7	TFA		Х
619	896.45	765999.4	919160.0	TVD/ML	Х	
620	887.16	765775.4	919122.9	TVD/ML	Х	
621	841.97	765343.7	918569.7	TVD/ML	X	

Table B-2a: Hydraulic Effectiveness Monitoring Wells for Groundwater Elevation Measurements

	M.P. Elev.	Planar Co	ordinates			
Well	(ft amsl)	Northing	Easting	Site Area	List "A"	List "B"
622	842.11	765344.6	918560.8	TVD/ML	Х	
623	852.67	765292.6	918000.3	TVD/ML	Χ	
624	853.46	765299.7	918006.4	TVD/ML	Χ	
625	808.77	764081.1	916908.4	SBA	Х	
626	808.60	764076.2	916901.0	SBA	X	
627	812.96	764545.6	916922.9	SBA	Х	
628	812.43	764537.3	916914.3	SBA	Χ	
629	818.39	765410.2	916642.9	WBA	Χ	
630	817.63	765399.8	916638.6	WBA	Х	
631	829.38	766060.3	916906.3	WBA	Х	
632	853.24	765667.6	917925.0	WMA	Х	
700	889.06	766967.5	917950.5	NBT/P001		X
701	888.24	767000.2	918002.8	NBT/P001		X
P01	810.62	765207.2	917610.9	WMA	Х	
P02	809.61	765162.9	917434.9	WMA	Х	
P04	914.73	766897.6	919096.5	TFA		Х
P07	894.47	766152.6	919063.9	TVD/ML	Х	
P08	894.70	766137.6	919137.3	TVD/ML	Х	
P11	895.21	765943.1	919227.8	TVD/ML	Х	

Planar coordinates are relative to the New York State grid and are expressed in feet.

Lists "A" and "B" are to be alternated as follows:

In Year 1, List "A" wells shall be measured in the first and third quarters; List "B" wells in the second and fourth quarters. In Year 2, List "A" wells shall be measured in the second and fourth quarters; List "B" wells in the first and third quarters. Years 3, 5, 7, etc. shall be the same as Year 1 and Years 4, 6, 8, etc. shall be the same as Year 2.

MT = Moore Tire Area (off-site)

NBT/P001 = NW Bedrock Trough/P001 Area

SBA = Southern Boundary Area

TFA = Tank Farm Area

TVD/MLA = Tower View Drive/Mirror Lake Area

WBA = Western Boundary Area

WMA = Waste Management Area

Table B-2b: Contaminant Reduction Monitoring Wells for Groundwater Sampling

101				Frequency		List "B"
110		SBA	South	S	X	
120	107A*	TFA	North	Q	Χ	Х
124	110	TFA	North	S		Х
125	120	WMA	South	S	X	
125	124	TFA	North	S		Х
127	125	TFA	North			
128	127					Х
129	128		North			
132						
133						
134					Χ	,
140R						X
146						
148						
149						^
157						
158						
160						Х
162						
163						
165						
166	163	WBA				
167	165		South			
178 WMA South S X 179 WMA South S X 181 WMA South A X 183 WMA South S X 186 SBA South S X 194 WMA South S X 306 TVD/MLA South S X 306 TVD/MLA South S X 309 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 321 TVD/MLA South Q X X 322	166	WBA	South			
179	167	WBA	South	S	Χ	
181 WMA South A X 183 WMA South S X 185 WBA South S X 186 SBA South S X 194 WMA South S X 306 TVD/MLA South A X 308 TVD/MLA South S X 309 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South S X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322	178	WMA	South	S	X	
183 WMA South S X 185 WBA South S X 186 SBA South S X 194 WMA South S X 306 TVD/MLA South A X 308 TVD/MLA South S X 309 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X	179	WMA	South	S	Х	
183 WMA South S X 185 WBA South S X 186 SBA South S X 194 WMA South S X 306 TVD/MLA South A X 308 TVD/MLA South S X 309 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South A X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X	181	WMA	South	Α	Х	
185 WBA South S X 186 SBA South S X 194 WMA South S X 306 TVD/MLA South A X 308 TVD/MLA South A X 309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South A X 317 WBA South S X 318 SBA South S X 319 SBA South Q X X 321 TVD/MLA South Q X X 322 SBA South Q X X 322 SBA South Q X X 324 NBT/P001 North S X	183	WMA	South		Х	
186 SBA South S X 194 WMA South S X 306 TVD/MLA South A X 308 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South S X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South Q X X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 351 SBA South A						
194 WMA South S X 306 TVD/MLA South A X 308 TVD/MLA South S X 309 TVD/MLA South S X 311 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 351 SBA South A X 352 SBA South A X						
306 TVD/MLA South A X 308 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 3351 SBA South S X 352 SBA South A X 353 TFA North A X						
308 TVD/MLA South S X 309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 3351 SBA South S X 352 SBA South A X 353 TFA North A X						
309 TVD/MLA South S X 313 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South Q X X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A						
313 TVD/MLA South A X 314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
314 SBA South A X 316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South Q X X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A						
316 WBA South S X 317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South Q X X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 355 SBA South A X 355 SBA South A		1				
317 WBA South S X 318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 358 NBT/P001 North A						
318 SBA South Q X X 319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North						
319 SBA South Q X X 321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A X 362 TVD/MLA South A X						
321 TVD/MLA South S X 322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A X 362 TVD/MLA South A X 363 TVD/MLA South A X						
322 SBA South Q X X 323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A X 362 TVD/MLA South A X 363 TVD/MLA South A X						Х
323 SBA South Q X X 324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A X 362 TVD/MLA South A X						
324 NBT/P001 North S X 325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A X 362 TVD/MLA South A X 363 TVD/MLA South A X						
325 NBT/P001 North S X 351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A X 362 TVD/MLA South A X 363 TVD/MLA South A X					X	
351 SBA South S X 352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X						X
352 SBA South A X 353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X						X
353 TFA North A X 354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X	351	SBA	South		X	
354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X	352	SBA	South	Α	X	
354 TFA North A X 355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X	353	TFA	North	А		X
355 SBA South A X 356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X	354	TFA	North	Α		
356 SBA South A X 357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X					Х	
357 NBT/P001 North S X 358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X						
358 NBT/P001 North A X 361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X						Х
361 NBT/P001 North A (V) X 362 TVD/MLA South A X 363 TVD/MLA South A X						
362 TVD/MLA South A X 363 TVD/MLA South A X						
363 TVD/MLA South A X					Y	^
36/1 NR 1/DOO1 North A/// V	364	NBT/P001	North	A (V)	^	X

Table B-2b: Contaminant Reduction Monitoring Wells for Groundwater Sampling

Well	Site Area	Site Region	Sampling Frequency	List "A"	List "B"
365	NBT/P001	North	A (V)		Х
366	NBT/P001	North	A (V)		Х
367	NBT/P001	North	S (V)		Х
368	NBT/P001	North	S (V)		Х
369	NBT/P001	North	A (V)		Х
370	NBT/P001	North	A (V)		Х
373	TVD/MLA	South	Š	Х	
374	TVD/MLA	South	S	Х	
378	NBT/P001	North	S		Х
379	NBT/P001	North	A (V)		Х
380	NBT/P001	North	A (V)		Х
381	NBT/P001	North	S (V)		Х
382	NBT/P001	North	A (V)		Х
383	NBT/P001	North	S		Х
386	WMA	South	A (V)	Х	
387	WBA	South	A (V)	X	
392	NBT/P001	North	S		Х
393	NBT/P001	North	Q	X	X
394	NBT/P001	North	S		X
395	NBT/P001	North	A (V)		X
397	NBT/P001	North	Α ()		X
398	NBT/P001	North	S		X
399	NBT/P001	North	Q	Х	X
404	WMA	South	Q (V)	X	X
405	WMA	South	Q (V)	X	X
413	NBT/P001	North	Q (V)	X	X
414	NBT/P001	North	` '	X	X
415	TFA	North	Q (V)	X	X
416	NBT/P001		Q (V)	X	X
417	NBT/P001	North North	Q (V)	X	X
			Q (V)	X	X
418	NBT/P001	North	Q (V)	Χ	
521	MT	North	S		X
522	MT	North	Q S	Х	X
524	MT	North			X
529	MT	North	Q	X	X
532	MT	North	Q	X	X
534	MT	North	Q S	X	Х
540	SBA	South	•	X	
541	SBA	South	S	X	
542	SBA	South	S	X	
543	SBA	South	S	X	.,
601	NBT/P001	North	S (V)		X
602	NBT/P001	North	S (V)		X
603	NBT/P001	North	S		X
604	NBT/P001	North	S		X
605	NBT/P001	North	A		X
606	NBT/P001	North	Q	X	X
607	NBT/P001	North	Q	X	Х
608	NBT/P001	North	S		Х
609	NBT/P001	North	Α		Х
610	NBT/P001	North	S		X
611	NBT/P001	North	S		X
612	NBT/P001	North	S		Х
613	NBT/P001	North	S		Х
614	WBA	South	Α	Х	
615	NBT/P001	North	Α		Х
616	NBT/P001	North	S		Х

Table B-2b: Contaminant Reduction Monitoring Wells for Groundwater Sampling

Well	Site Area	Site Region	Sampling Frequency	List "A"	List "B"
617	NBT/P001	North	S		Х
618	TFA	North	S		Х
619	TVD/MLA	South	Α	X	
620	TVD/MLA	South	S	X	
621	TVD/MLA	South	S	X	
622	TVD/MLA	South	S	X	
623	TVD/ML	South	A (V)	X	
624	TVD/ML	South	A (V)	X	
625	SBA	South	Q	X	Х
626	SBA	South	S	X	
627	SBA	South	S	X	
627	SBA	South	S (V)	Х	
628	SBA	South	A (V)	X	
629	WBA	South	A (V)	X	
630	WBA	South	A (V)	X	
631	WBA	South	S	X	
632	WMA	South	S	X	
700	NBT/P001	North	Q	X	Х
701	NBT/P001	North	Q	X	Х
P04	TFA	North	Α		Х
P08	TVD/MLA	South	Α	X	
P11	TVD/MLA	South	Α	X	

Key:

MT = Moore Tire Area (off-site)

NBT/P001 = NW Bedrock Trough/P001 Area

SBA = Southern Boundary Area (partially off-site)

TFA = Tank Farm Area

TVD/MLA = Tower View Drive/Mirror Lake Area

WBA = Western Boundary Area

WMA = Waste Management Area

A = Annual Frequency

S = Semiannual Frequency

Q = Quarterly Frequency

(V) = Voluntary Sampling

* Site-wide upgradient well to be sampled quarterly.

X = Analyze all samples for volatile organic compounds by SW 846 Method 8260C.

Lists "A" and "B" are to be alternated as follows:

In Year 1, List "A" wells shall be sampled in the first and third quarters; List "B" wells in the second and fourth quarters. In Year 2, List "A" wells shall be sampled in the second and fourth quarters; List "B" wells in the first and third quarters. Years 3, 5, 7, etc. shall be the same as Year 1 and Years 4, 6, 8, etc. shall be the same as Year 2. All listed monitoring wells are hydraulic effectiveness monitoring wells. Refer to Table B-2a for a complete list and schedule of groundwater elevation measurements.

APPENDIX C

Groundwater Elevation Data January 1, 2018 - December 31, 2018

2018 Well Inspection Summary with Dedicated Equipment Assignments

Jiodiidwatei Lievatioii Data					
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)	
106	2/26/2018	914.91	2.11	912.80	
107A	2/26/2018	961.80	16.60	945.20	
110	2/26/2018	946.88	7.40	939.48	
113	2/26/2018	914.83	6.27	908.56	
114	2/26/2018	916.13	Dry	<902.6	
123	2/26/2018	903.96	4.04	899.92	
124	2/26/2018	911.43	5.02	906.41	
125	2/26/2018	905.36	4.45	900.91	
126	2/26/2018	908.95	7.94	901.01	
127	2/26/2018	909.65	3.70	905.95	
128	2/26/2018	914.23	19.37	894.86	
129	2/26/2018	912.10	2.70	909.40	
132	2/26/2018	915.31	15.62	899.69	
134	2/26/2018	916.46	17.92	898.54	
140R	2/26/2018	889.17	30.74	858.43	
143	2/26/2018	884.81	NA	NA	
146	2/26/2018	868.04	4.48	863.56	
154	2/26/2018	861.70	1.66	860.04	
157	2/26/2018	854.13	4.88	849.25	
324	2/26/2018	892.60	33.26	859.34	
325	2/26/2018	892.08	29.93	862.15	
353	2/26/2018	912.87	17.70	895.17	
354	2/26/2018	912.85	11.35	901.50	
357	2/26/2018	863.89	2.12	861.77	
358	2/26/2018	864.08	2.25	861.83	
361	2/26/2018	868.42	4.43	863.99	
364	2/26/2018	897.68	33.90	863.78	
365	2/26/2018	898.00	35.47	862.53	
366	2/26/2018	912.48	37.98	874.50	
367	2/26/2018	910.08	45.75	864.33	

or our attace.	Licvation Bata			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
368	2/26/2018	910.15	44.32	865.83
378	2/26/2018	900.02	37.37	862.65
379	2/26/2018	899.66	37.65	862.01
382	2/26/2018	912.59	11.76	900.83
383	2/26/2018	867.39	3.60	863.79
392	2/26/2018	895.98	31.43	864.55
393	2/26/2018	892.55	29.92	862.63
394	2/26/2018	892.29	30.54	861.75
395	2/26/2018	890.04	27.66	862.38
397	2/26/2018	865.79	7.73	858.06
398	2/26/2018	865.37	5.99	859.38
399	2/26/2018	867.33	4.96	862.37
413	2/26/2018	889.16	41.53	847.63
414	2/26/2018	893.11	53.65	839.46
415	2/26/2018	914.38	21.10	893.28
416	2/26/2018	890.58	65.97	824.61
521	2/26/2018	863.78	1.50	862.28
522	2/26/2018	864.46	2.13	862.33
524	2/26/2018	866.28	4.55	861.73
529	2/26/2018	863.93	2.84	861.09
532	2/26/2018	866.34	4.62	861.72
534	2/26/2018	862.88	2.61	860.27
540	2/26/2018	810.55	10.79	799.76
541	2/26/2018	812.11	12.46	799.65
542	2/26/2018	806.40	7.77	798.63
543	2/26/2018	823.64	23.86	799.78
601	2/26/2018	862.08	2.00	860.08
602	2/26/2018	862.15	2.44	859.71
603	2/26/2018	864.18	5.65	858.53
604	2/26/2018	885.48	12.76	872.72

Grodinawater Elevation Bata				
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
605	2/26/2018	885.23	16.44	868.79
606	2/26/2018	900.06	38.25	861.81
607	2/26/2018	900.46	38.12	862.34
608	2/26/2018	861.51	2.23	859.28
609	2/26/2018	895.16	25.11	870.05
610	2/26/2018	909.10	15.70	893.40
611	2/26/2018	909.11	10.48	898.63
612	2/26/2018	903.93	32.65	871.28
613	2/26/2018	903.94	32.90	871.04
615	2/26/2018	862.69	4.93	857.76
616	2/26/2018	888.18	6.05	882.13
617	2/26/2018	895.77	5.77	890.00
618	2/26/2018	909.29	3.14	906.15
P04	2/26/2018	914.73	5.37	909.36
101	6/4/2018	814.01	15.95	798.06
120	6/4/2018	846.20	21.38	824.82
133	6/4/2018	897.22	26.48	870.74
147	6/4/2018	871.57	17.09	854.48
148	6/4/2018	857.87	19.11	838.76
149	6/4/2018	834.27	19.07	815.20
158	6/4/2018	838.28	10.57	827.71
160	6/4/2018	824.31	11.15	813.16
161	6/4/2018	824.96	11.69	813.27
162	6/4/2018	825.50	8.78	816.72
163	6/4/2018	825.40	9.44	815.96
165	6/4/2018	817.50	7.65	809.85
166	6/4/2018	813.71	22.90	790.81
167	6/4/2018	813.26	7.47	805.79
178	6/4/2018	812.22	6.97	805.25
179	6/4/2018	818.32	35.93	782.39

oanawate.	Licvation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
181	6/4/2018	894.65	30.30	864.35
183	6/4/2018	851.83	24.87	826.96
185	6/4/2018	815.54	27.84	787.70
186	6/4/2018	820.32	36.56	783.76
194	6/4/2018	862.70	28.28	834.42
306	6/4/2018	821.04	4.55	816.49
308	6/4/2018	876.26	14.80	861.46
309	6/4/2018	874.69	27.69	847.00
313	6/4/2018	849.79	32.22	817.57
314	6/4/2018	813.82	17.65	796.17
316	6/4/2018	813.46	22.68	790.78
317	6/4/2018	823.00	9.74	813.26
318	6/4/2018	814.19	16.88	797.31
319	6/4/2018	806.89	9.22	797.67
321	6/4/2018	853.72	34.13	819.59
322	6/4/2018	806.20	8.99	797.21
323	6/4/2018	813.67	15.70	797.97
351	6/4/2018	805.62	9.47	796.15
352	6/4/2018	806.48	10.00	796.48
355	6/4/2018	813.42	16.23	797.19
356	6/4/2018	813.31	15.78	797.53
362	6/4/2018	832.69	13.81	818.88
363	6/4/2018	855.07	32.18	822.89
372	6/4/2018	904.96	43.63	861.33
373	6/4/2018	832.19	12.40	819.79
374	6/4/2018	821.25	5.01	816.24
375	6/4/2018	833.00	10.74	822.26
386	6/4/2018	822.26	10.06	812.20
387	6/4/2018	817.59	6.89	810.70
391	6/4/2018	833.75	11.58	822.17

o o a martate	Lictation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
540	6/4/2018	810.55	15.68	794.87
541	6/4/2018	812.11	17.88	794.23
542	6/4/2018	806.40	11.87	794.53
543	6/4/2018	823.64	27.51	796.13
614	6/4/2018	811.80	16.94	794.86
619	6/4/2018	896.45	10.20	886.25
620	6/4/2018	887.16	17.40	869.76
621	6/4/2018	841.97	20.83	821.14
622	6/4/2018	842.11	20.23	821.88
623	6/4/2018	852.67	40.53	812.14
624	6/4/2018	853.46	41.20	812.26
625	6/4/2018	808.77	11.30	797.47
626	6/4/2018	808.60	12.44	796.16
627	6/4/2018	812.96	13.51	799.45
628	6/4/2018	812.43	19.40	793.03
629	6/4/2018	818.39	27.34	791.05
630	6/4/2018	817.63	26.78	790.85
631	6/4/2018	829.38	6.78	822.60
632	6/4/2018	853.24	33.30	819.94
P01	6/4/2018	810.62	2.26	808.36
P02	6/4/2018	809.61	4.46	805.15
P07	6/4/2018	894.47	3.17	891.30
P08	6/4/2018	894.70	6.13	888.57
P11	6/4/2018	895.21	10.33	884.88
106	7/16/2018	914.91	2.12	912.79
107A	7/16/2018	961.80	17.01	944.79
110	7/16/2018	946.88	7.58	939.30
113	7/16/2018	914.83	6.94	907.89
114	7/16/2018	916.13	DRY	<902.6
123	7/16/2018	903.96	4.38	899.58

Giodilawatei Lievation Data					
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)	
124	7/16/2018	911.43	7.03	904.40	
125	7/16/2018	905.36	8.01	897.35	
126	7/16/2018	908.95	8.53	900.42	
127	7/16/2018	909.65	5.01	904.64	
128	7/16/2018	914.23	19.02	895.21	
129	7/16/2018	912.10	3.12	908.98	
132	7/16/2018	915.31	17.07	898.24	
134	7/16/2018	916.46	19.20	897.26	
140R	7/16/2018	889.17	30.10	859.07	
143	7/16/2018	884.81	5.44	879.37	
146	7/16/2018	868.04	5.10	862.94	
154	7/16/2018	861.70	1.80	859.90	
157	7/16/2018	854.13	9.69	844.44	
324	7/16/2018	892.60	32.57	860.03	
325	7/16/2018	892.08	28.63	863.45	
353	7/16/2018	912.87	12.42	900.45	
354	7/16/2018	912.85	8.56	904.29	
357	7/16/2018	863.89	2.13	861.76	
358	7/16/2018	864.08	2.26	861.82	
361	7/16/2018	868.42	5.71	862.71	
364	7/16/2018	897.68	33.77	863.91	
365	7/16/2018	898.00	35.30	862.70	
366	7/16/2018	912.48	38.10	874.38	
367	7/16/2018	910.08	45.23	864.85	
368	7/16/2018	910.15	43.60	866.55	
378	7/16/2018	900.02	37.03	862.99	
379	7/16/2018	899.66	37.44	862.22	
382	7/16/2018	912.59	10.57	902.02	
383	7/16/2018	867.39	4.36	863.03	
392	7/16/2018	895.98	31.94	864.04	

Giodilawatei	Lievation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
393	7/16/2018	892.55	29.58	862.97
394	7/16/2018	892.29	30.10	862.19
395	7/16/2018	890.04	26.78	863.26
397	7/16/2018	865.79	9.46	856.33
398	7/16/2018	865.37	9.62	855.75
399	7/16/2018	867.33	5.40	861.93
413	7/16/2018	889.16	41.50	847.66
414	7/16/2018	893.11	53.58	839.53
415	7/16/2018	914.38	21.00	893.38
416	7/16/2018	890.58	65.70	824.88
521	7/16/2018	863.78	1.68	862.10
522	7/16/2018	864.46	1.83	862.63
524	7/16/2018	866.28	4.66	861.62
529	7/16/2018	863.93	3.02	860.91
532	7/16/2018	866.34	4.74	861.60
534	7/16/2018	862.88	1.99	860.89
540	7/16/2018	810.55	17.03	793.52
541	7/16/2018	812.11	19.37	792.74
542	7/16/2018	806.40	13.14	793.26
543	7/16/2018	823.64	28.23	795.41
601	7/16/2018	862.08	2.32	859.76
602	7/16/2018	862.15	4.18	857.97
603	7/16/2018	864.18	9.32	854.86
604	7/16/2018	885.48	13.34	872.14
605	7/16/2018	885.23	16.90	868.33
606	7/16/2018	900.06	37.99	862.07
607	7/16/2018	900.46	37.84	862.62
608	7/16/2018	861.51	3.40	858.11
609	7/16/2018	895.16	24.20	870.96
610	7/16/2018	909.10	15.04	894.06

o di la water	Licvation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
611	7/16/2018	909.11	11.04	898.07
612	7/16/2018	903.93	32.10	871.83
613	7/16/2018	903.94	32.15	871.79
615	7/16/2018	862.69	6.66	856.03
616	7/16/2018	888.18	5.56	882.62
617	7/16/2018	895.77	5.60	890.17
618	7/16/2018	909.29	5.13	904.16
P04	7/16/2018	914.73	5.38	909.35
101	11/26/2018	814.01	12.20	801.81
120	11/26/2018	846.20	19.30	826.90
133	11/26/2018	897.22	25.73	871.49
147	11/26/2018	871.57	15.38	856.19
148	11/26/2018	857.87	17.88	839.99
149	11/26/2018	834.27	16.53	817.74
158	11/26/2018	838.28	8.18	830.10
160	11/26/2018	824.31	9.70	814.61
161	11/26/2018	824.96	20.00	804.96
162	11/26/2018	825.50	9.21	816.29
163	11/26/2018	825.40	10.30	815.10
165	11/26/2018	817.50	5.60	811.90
166	11/26/2018	813.71	19.37	794.34
167	11/26/2018	813.26	5.95	807.31
178	11/26/2018	812.22	5.04	807.18
179	11/26/2018	818.32	31.24	787.08
181	11/26/2018	894.65	26.50	868.15
183	11/26/2018	851.83	22.25	829.58
185	11/26/2018	815.54	24.17	791.37
186	11/26/2018	820.32	33.67	786.65
194	11/26/2018	862.70	26.51	836.19
306	11/26/2018	821.04	2.74	818.30

Giodilawatei	Lievation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
308	11/26/2018	876.26	10.85	865.41
309	11/26/2018	874.69	26.76	847.93
313	11/26/2018	849.79	29.45	820.34
314	11/26/2018	813.82	13.30	800.52
316	11/26/2018	813.46	18.90	794.56
317	11/26/2018	823.00	8.31	814.69
318	11/26/2018	814.19	12.76	801.43
319	11/26/2018	806.89	5.30	801.59
321	11/26/2018	853.72	23.82	829.90
322	11/26/2018	806.20	4.88	801.32
323	11/26/2018	813.67	11.92	801.75
351	11/26/2018	805.62	5.12	800.50
352	11/26/2018	806.48	5.59	800.89
355	11/26/2018	813.42	12.01	801.41
356	11/26/2018	813.31	11.65	801.66
362	11/26/2018	832.69	11.74	820.95
363	11/26/2018	855.07	30.17	824.90
372	11/26/2018	904.96	40.53	864.43
373	11/26/2018	832.19	10.26	821.93
374	11/26/2018	821.25	3.62	817.63
375	11/26/2018	833.00	7.56	825.44
386	11/26/2018	822.26	6.87	815.39
387	11/26/2018	817.59	5.08	812.51
391	11/26/2018	833.75	8.50	825.25
540	11/26/2018	810.55	10.54	800.01
541	11/26/2018	812.11	12.42	799.69
542	11/26/2018	806.40	6.50	799.90
543	11/26/2018	823.64	22.75	800.89
614	11/26/2018	811.80	12.32	799.48
619	11/26/2018	896.45	9.94	886.51

o di i di	Licvation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
620	11/26/2018	887.16	15.76	871.40
621	11/26/2018	841.97	17.52	824.45
622	11/26/2018	842.11	17.10	825.01
623	11/26/2018	852.67	38.27	814.40
624	11/26/2018	853.46	38.92	814.54
625	11/26/2018	808.77	7.16	801.61
626	11/26/2018	808.60	7.96	800.64
627	11/26/2018	812.96	10.47	802.49
628	11/26/2018	812.43	15.94	796.49
629	11/26/2018	818.39	24.12	794.27
630	11/26/2018	817.63	23.58	794.05
631	11/26/2018	829.38	4.40	824.98
632	11/26/2018	853.24	32.68	820.56
P01	11/26/2018	810.62	1.32	809.30
P02	11/26/2018	809.61	2.55	807.06
P07	11/26/2018	894.47	2.93	891.54
P08	11/26/2018	894.70	5.69	889.01
P11	11/26/2018	895.21	9.27	885.94
113	12/5/2018	914.83	6.98	907.85
114	12/5/2018	916.13	Dry	<899.5
123	12/5/2018	903.96	3.14	900.82
124	12/5/2018	911.43	4.24	907.19
125	12/5/2018	905.36	6.92	898.44
126	12/5/2018	908.95	6.81	902.14
127	12/5/2018	909.65	3.02	906.63
128	12/5/2018	914.23	17.67	896.56
140R	12/5/2018	889.17	30.79	858.38
143	12/5/2018	884.81	3.11	881.70
146	12/5/2018	868.04	4.46	863.58
154	12/5/2018	861.70	1.70	860.00

or our lawater	Lictation Data			
Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
157	12/5/2018	854.13	6.03	848.10
324	12/5/2018	892.60	29.32	863.28
325	12/5/2018	892.08	27.58	864.50
353	12/5/2018	912.87	12.42	900.45
354	12/5/2018	912.85	10.81	902.04
357	12/5/2018	863.89	1.66	862.23
358	12/5/2018	864.08	1.84	862.24
361	12/5/2018	868.42	4.65	863.77
364	12/5/2018	897.68	33.24	864.44
365	12/5/2018	898.00	34.92	863.08
366	12/5/2018	912.48	38.42	874.06
367	12/5/2018	910.08	44.41	865.67
368	12/5/2018	910.15	42.71	867.44
378	12/5/2018	900.02	36.38	863.64
379	12/5/2018	899.66	37.12	862.54
382	12/5/2018	912.59	10.52	902.07
383	12/5/2018	867.39	3.72	863.67
392	12/5/2018	895.98	22.21	873.77
393	12/5/2018	892.55	28.71	863.84
394	12/5/2018	892.29	29.88	862.41
395	12/5/2018	890.04	25.87	864.17
397	12/5/2018	865.79	8.13	857.66
398	12/5/2018	865.37	7.02	858.35
399	12/5/2018	867.33	4.57	862.76
413	12/5/2018	889.16	41.44	847.72
415	12/5/2018	914.38	20.03	894.35
416	12/5/2018	890.58	65.88	824.70
418	12/5/2018	893.21	39.89	853.32
521	12/5/2018	863.78	1.07	862.71
522	12/5/2018	864.46	1.19	863.27

Well ID	Date of Measurement	Top of Casing Elevation (ft amsl)	Depth to Water (ft below TOC)	Groundwater Elevation (ft amsl)
524	12/5/2018	866.28	4.27	862.01
529	12/5/2018	863.93	2.88	861.05
532	12/5/2018	866.34	4.47	861.87
534	12/5/2018	862.88	1.20	861.68
601	12/5/2018	862.08	1.98	860.10
602	12/5/2018	862.15	2.84	859.31
603	12/5/2018	864.18	6.64	857.54
604	12/5/2018	885.48	12.61	872.87
605	12/5/2018	885.23	16.13	869.10
606	12/5/2018	900.06	37.61	862.45
607	12/5/2018	900.46	37.04	863.42
608	12/5/2018	861.51	2.54	858.97
609	12/5/2018	895.16	23.37	871.79
610	12/5/2018	909.10	13.98	895.12
611	12/5/2018	909.11	11.13	897.98
612	12/5/2018	903.93	30.86	873.07
613	12/5/2018	903.94	30.97	872.97
615	12/5/2018	862.69	5.41	857.28
616	12/5/2018	888.18	5.70	882.48
617	12/5/2018	895.77	4.53	891.24
618	12/5/2018	909.29	3.87	905.42
700	12/5/2018	889.06	25.23	863.83
701	12/5/2018	888.24	23.18	865.06

	2018 Depth	Well Tag	Reference	Standpipe	Sanitary	Sampling
Well ID	to Bottom	Condition	Point	Paint	Seal	Equipment
	(ft)**	Condition	Visible?	Condition	Condition	Туре
101	41.00	Good	Yes	Re-Paint	Good	PDB
106	13.19	Good	Yes	Good	Good	PDB
107A	64.62	Good	Yes	Good	Good	PDB
110	21.20	Good	Yes	Manhole	Good	PDB
113	12.65	Good	Yes	Good	Good	*
114	12.00	Good	Yes	Good	Good	*
120	39.22	Good	Yes	Good	Good	PDB
123	21.90	Good	Yes	Manhole	Good	*
124	25.30	Good	Yes	Good	Good	PDB
125	24.18	Good	Yes	Manhole	Good	PDB
126	23.98	Good	Yes	Manhole	Good	*
127	19.02	Good	Yes	Manhole	Good	PDB
128	24.48	Good	Yes	Good	Good	PDB
129	7.44	Good	Yes	Manhole	Good	PDB
132	21.20	Good	Yes	Good	Good	PDB
133	31.44	Good	Yes	Good	Good	PDB
134	42.85	Good	Yes	Good	Good	PDB
140R	45.03	Good	Yes	Good	Godd	PDB
143	28.91	Good	Yes	Manhole	Good	*
146	25.85	Good	Yes	Good	Good	PDB
147	27.24	Good	Yes	Good	Good	*
148	34.97	Good	Yes	Good	Good	PDB
149	33.05	Good	Yes	Good	Good	PDB
154	25.40	Good	Yes	Good	Good	
157	19.78	Good	Yes	Re-Paint	Good	PDB
158	39.46	Good	Yes	Re-Paint	Good	PDB
160	58.46	Good	Yes	Re-Paint	Good	PDB
161	22.66	Good	Yes	Re-Paint	Good	*
162	50.47	Good	Yes	Re-Paint	Good	PDB
163	25.31	Good	Yes	Re-Paint	Good	PDB
165	43.88	Good	Yes	Re-Paint	Good	PDB
166	90.52	Good	Yes	Re-Paint	Good	PDB
167	25.33	Good	Yes	Re-Paint	Good	PDB
178	36.28	Good	Yes	Re-Paint	Good	PDB
179	71.41	Good	Yes	Re-Paint	Good	PDB
181	40.62	Good	Yes	Good	Good	PDB
183	30.76	Good	Yes	Good	Good	PDB
185	94.13	Good	Yes	Re-Paint	Good	2" SP/Line
186	95.60	Good	Yes	Re-Paint	Good	2" SP/Line

	2018 Depth	Well Tag	Reference	Standpipe	Sanitary	Sampling
Well ID	to Bottom	Condition	Point	Paint	Seal	Equipment
	(ft)**	Condition	Visible?	Condition	Condition	Туре
194	111.10	Good	Yes	Good	Good	2" SP/Line
306	62.35	Good	Yes	Good	Good	2" SP/Line
308	30.00	Good	Yes	Good	Good	PDB
309	32.17	Good	Yes	Good	Good	PDB
313	39.94	Good	Yes	Good	Good	PDB
314	100.12	Good	Yes	Re-Paint	Good	PDB
316	48.95	Good	Yes	Re-Paint	Good	PDB
317	47.01	Good	Yes	Re-Paint	Good	PDB
318	47.21	Good	Yes	Re-Paint	Good	PDB
319	44.57	Good	Yes	Re-Paint	Good	PDB
321	39.45	Good	Yes	Good	Good	PDB
322	45.06	Good	Yes	Re-Paint	Good	PDB
323	40.96	Good	Yes	Re-Paint	Good	PDB
324	53.64	Good	Yes	Good	Good	PDB
325	42.55	Good	Yes	Good	Good	PDB
351	90.15	Good	Yes	Re-Paint	Good	Ded. 2" SP
352	87.19	Good	Yes	Re-Paint	Good	Ded. 2" SP
353	28.43	Good	Yes	Manhole	Good	PDB
354	17.15	Good	Yes	Manhole	Good	Bailer-3'
355	97.95	Good	Yes	Good	Good	PDB
356	70.15	Good	Yes	Good	Good	PDB
357	34.40	Good	Yes	Re-Paint	Good	PDB
358	17.10	Good	Yes	Re-Paint	Good	PDB
361	35.25	Good	Yes	Good	Good	PDB
362	66.50	Good	Yes	Good	Good	PDB
363	45.29	Good	Yes	Good	Good	PDB
364	65.13	Good	Yes	Good	Good	PDB
365	45.68	Good	Yes	Good	Good	PDB
366	42.87	Good	Yes	Good	Good	Bailer-3'
367	72.32	Good	Yes	Good	Good	PDB
368	48.72	Good	Yes	Good	Good	Bailer-3'
372	65.43	Good	Yes	Good	Good	*
373	45.63	Good	Yes	Good	Good	PDB
374	20.87	Good	Yes	Good	Good	PDB
375	45.65	Good	Yes	Re-Paint	Good	*
378	77.17	Good	Yes	Good	Good	PDB
379	52.57	Good	Yes	Good	Good	PDB
382	22.37	Good	Yes	Good	Good	PDB
383	16.70	Good	Yes	Good	Good	PDB

Well ID	2018 Depth to Bottom	Well Tag	Reference Point	Standpipe Paint	Sanitary Seal	Sampling Equipment
Well ID	(ft)**	Condition	Visible?	Condition	Condition	Туре
386	17.33	Good	Yes	Good	Good	PDB
387	15.38	Good	Yes	Re-Paint	Good	PDB
391	30.19	Good	Yes	Good	Good	*
392	46.13	Good	Yes	Good	Good	PDB
393	64.91	Good	Yes	Good	Good	Ded. 2" SP
394	47.30	Good	Yes	Good	Good	PDB
395	64.44	Good	Yes	Good	Good	PDB
397	39.84	Good	Yes	Good	Good	PDB
398	18.55	Good	Yes	Good	Good	PDB
399	16.54	Good	Yes	Good	Good	PDB
404	NM	Good	Yes	Good	NA	Тар
405	NM	Good	Yes	Good	NA	Тар
413	NM	Good	Yes	Good	NA	Тар
414	NM	Good	Yes	Good	NA	Тар
415	NM	Good	Yes	Good	NA	Тар
416	NM	Good	Yes	Good	NA	Тар
417	~71	New	Yes	New	New	Тар
418	~46	New	Yes	New	New	Тар
521	39.52	Good	Yes	Manhole	Good	PDB
522	33.95	Replace	Yes	Good	Good	PDB
524	36.11	Good	Yes	Good	Good	PDB
529	13.78	Good	Yes	Manhole	Good	PDB
532	17.16	Good	Yes	Good	Good	PDB
534	12.90	Good	Yes	Manhole	Good	PDB
540	50.85	Good	Yes	Good	None	PDB
541	54.93	Good	Yes	Good	None	PDB
542	43.90	Good	Yes	Good	None	PDB
543	54.15	Good	Yes	Re-Paint	None	PDB
601	15.40	Good	Yes	Good	Good	PDB
602	19.35	Good	Yes	Re-Paint	Good	PDB
603	17.78	Good	Yes	Good	Good	PDB
604	22.02	Good	Yes	Manhole	Good	PDB
605	46.35	Good	Yes	Manhole	Good	PDB
606	47.39	Good	Yes	Manhole	Good	PDB
607	59.68	Good	Yes	Manhole	Good	PDB
608	16.62	No	Yes	Re-Paint	Good	PDB
609	52.36	Good	Yes	Manhole	Good	PDB
610	32.05	Good	Yes	Manhole	Good	PDB
611	13.34	Good	Yes	Manhole	Good	Peristaltic

Well ID	2018 Depth to Bottom	Well Tag Condition	Reference Point	Standpipe Paint	Sanitary Seal	Sampling Equipment
	(ft)**	Contaction	Visible?	Condition	Condition	Туре
612	56.92	Good	Yes	Manhole	Good	PDB
613	41.47	Good	Yes	Manhole	Good	PDB
614	104.60	Good	Yes	Re-Paint	Good	PDB
615	45.94	Good	Yes	Re-Paint	Good	PDB
616	31.41	Good	Yes	Good	Good	PDB
617	37.17	Good	Yes	Manhole	Good	PDB
618	28.71	Good	Yes	Good	Good	PDB
619	14.92	Good	Yes	Manhole	Good	PDB
620	17.42	Good	Yes	Good	Good	Peristaltic
621	37.15	Good	Yes	Good	Good	PDB
622	46.42	Good	Yes	Good	Good	PDB
623	54.45	Good	Yes	Good	Good	PDB
624	64.25	Replace	Yes	Re-Paint	Good	PDB
625	44.25	Good	Yes	Good	Good	PDB
626	92.26	Good	Yes	Good	Good	PDB
627	50.82	Good	Yes	Re-Paint	Good	PDB
628	100.58	Good	Yes	Re-Paint	Good	PDB
629	51.27	Good	Yes	Re-Paint	Good	PDB
630	93.41	Good	Yes	Re-Paint	Good	PDB
631	31.38	Good	Yes	Re-Paint	Good	PDB
632	39.18	Good	Yes	Good	Good	PDB
700	~67	New	Yes	New	New	2" SP/Bailer
701	~65	New	Yes	New	New	2" SP/Bailer
P01	11.13	Good	Yes	Re-Paint	Good	*
P02	10.34	Good	Yes	Re-Paint	Good	*
P04	20.47	Good	Yes	Good	Good	PDB
P07	5.15	Good	Yes	Manhole	Good	*
P08	8.70	Good	Yes	Manhole	Good	PDB
P11	14.52	Good	Yes	Manhole	Good	PDB

Key:

Ded. 2" SP = Dedicated 2-inch diameter submersible pump

Length of bailer in feet is indicated where a bailer is used

PDB = Polyethylene diffusion bag sampling device

NM = Not measured (well bottom not accessible)

^{*} Not sampled (water level measurement only)

^{**} Depth to bottom from top of reference point

APPENDIX D

2018 Sampling Plan Groundwater Monitoring Program

Former Owego, New York Facility 2018 Groundwater Sampling Plan

			Northern	Southern	Northern	Southern			
	1		Area Focus	Area Focus	Area Focus	Area Focus	- "	1	
Well	Site Area	Site Region	First Quarter*	Second Quarter*	Third	Fourth Quarter	Sampling Frequency	Program	Unit Monitored
101	SBA	South	Quarter	X	Quarter	X	S	GMP	Outwash Sand
106	TFA	North		Λ	Х	Λ	A	V	Till?
107A	TFA	North	Х	Х	X	Х	Q	GMP	Bedrock
110	TFA	North	X	Λ	X	Λ	S	GMP	Till/Bedrock
120	WMA	South	X	Х	X	Х	S	GMP	Till/Bedrock
124	TFA	North	X	Λ.	Х	Λ	S	GMP	Till/Bedrock
125	TFA	North	X		X		S	GMP	Sand & Gravel/Bedrock
127	TFA	North	X		X		S	GMP	Sand & Gravel/Bedrock
128	TFA	North	^		X		A	GMP	Till/Bedrock
129	TFA	North	X		X		S	GMP	Till/Bedrock
132	TFA	North	^		X		A	GMP	Bedrock
				V	^	V			
133	TVD/MLA	South	V	Х	V	Х	S	GMP	Till/Bedrock
134	TFA	North	Х		X		S	GMP	Till/Bedrock
140R	NBT/P001	North	V		X		A	GMP	Till/Bedrock
146	NBT/P001	North	Х	.,	Х	.,	S	GMP	Till/Bedrock
148	WMA	South		X		X	S	GMP	Till/Bedrock
149	WMA	South		Х	.,	Х	S	GMP	Till/Bedrock
157	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
158	WBA	South				Х	Α	GMP	Till/Bedrock
160	WBA	South		X		Х	S	GMP	Basal Till
162	WBA	South		Х		Х	S	GMP	Till/Bedrock
163	WBA	South				Х	Α	GMP	Alluvial Silt and Gravel
165	WBA	South		Х		Х	S	GMP	Till/Bedrock
166	WBA	South		Х		Х	S	GMP	Till/Bedrock
167	WBA	South		Х		Х	S	GMP	Silt
178	WMA	South		Х		Х	S	GMP	Gravel/Bedrock
179	WMA	South		Х		Х	S	GMP	Outwash Sand
181	WMA	South				Х	Α	GMP	Till/Bedrock
183	WMA	South		Х		Х	S	GMP	Till/Bedrock
185	WBA	South		Х		Х	S	GMP	Sand & Gravel/Bedrock
186	SBA	South		Х		Х	S	GMP	Sand & Gravel/Bedrock
194	WMA	South		Х		Х	S	GMP	Bedrock
306	TVD/MLA	South				Х	Α	GMP	Sand & Gravel/Bedrock
308	TVD/MLA	South		Х		Х	S	GMP	Till/Bedrock
309	TVD/MLA	South		Х		Х	S	GMP	Till
313	TVD/MLA	South				Х	Α	GMP	Till/Bedrock?
314	SBA	South				Х	Α	GMP	Basal Till
316	WBA	South		Х		Х	S	GMP	Glaciolac., vf sand, silt, clay
317	WBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
318	SBA	South	Х	Х	Х	Х	Q	GMP	Outwash Sand & Gravel
319	SBA	South	Х	Х	Х	Х	Q	GMP	Outwash Sand
321	TVD/MLA	South		Х		Х	S	GMP	Sand & Gravel/Till
322	SBA	South	Х	Х	Х	Х	Q	GMP	Outwash Sand & Gravel
323	SBA	South	Х	Х	Х	Х	Q	GMP	Outwash Sand
324	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
325	NBT/P001	North	Х		Х		S	GMP	Alluvial Gravel
351	SBA	South		Х		Х	S	GMP	Till/Bedrock
352	SBA	South				Х	Α	GMP	Basal Till
353	TFA	North			Х		Α	GMP	Bedrock
354	TFA	North			Х		Α	GMP	Till
355	SBA	South				Х	A	GMP	Bedrock
356	SBA	South				X	A	GMP	Outwash Sand & Gravel
357	NBT/P001	North	Х		Х		S	GMP	Bedrock
358	NBT/P001	North			X		A	GMP	Alluvial Sand & Gravel
361	NBT/P001	North			X		A	V	Bedrock
362	TVD/MLA	South			,	X	A	GMP	Bedrock
302		Journ	1	l				31711	Dearoak

Former Owego, New York Facility 2018 Groundwater Sampling Plan

Well			Area Focus	Area Focus	Area Focus	Area Focus			
	Site Area	Site	First	Second	Third	Fourth	Sampling	Program	Unit Monitored
vv CII	Site Area	Region	Quarter*	Quarter*	Quarter	Quarter	Frequency	Program	Offic Mofficored
363	TVD/MLA	South				Х	Α	GMP	Bedrock
364	NBT/P001	North			Х		Α	V	Till/Bedrock
365	NBT/P001	North			Х		Α	V	Alluvial Sand & Gravel
366	NBT/P001	North			Х		Α	V	Till/Bedrock
367	NBT/P001	North	Х		Х		S	V	Till/Bedrock
368	NBT/P001	North	Х		Х		S	V	Alluvial Silt, Sand, Gravel
373	TVD/MLA	South		Х		Х	S	GMP	Outwash Sand & Gravel
374	TVD/MLA	South		Х		Х	S	GMP	Sand & Gravel
378	NBT/P001	North	Х	Х	Х	Х	Q	GMP	Bedrock
379	NBT/P001	North			Х		А	V	Till
382	NBT/P001	North			Х		А	V	Fill
383	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt & f. Sand
386	WMA	South				Х	Α	V	Alluvial Sand & Gravel
387	WBA	South				Х	Α	V	Alluvial Silt, Sand, Gravel
392	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt, Sand, Gravel
393	NBT/P001	North	Х	Х	Х	Х	Q	GMP	Till/Bedrock
394	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt, Sand, Gravel
395	NBT/P001	North			Х		Α	V	Till/Bedrock
397	NBT/P001	North			Х		Α	GMP	Till/Bedrock
398	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt, Sand, Gravel
399	NBT/P001	North	Х	Х	Х	Х	Q	GMP	Alluvial Silt, Sand, Gravel
404	WMA	South	Х	Х	Х	Х	Q	V	Silt, Sand & Gravel
405	WMA	South	Х	Х	Х	Х	Q	V	Sand & Gravel/Till/Bedrock
413	NBT/P001	North	Х	Х	Х	Х	Q	V	Till/Bedrock
414	NBT/P001	North	Х	Х	Х	Х	Q	V	lluvial Sand & Gravel/Till/Bedroo
415	TFA	North	Х	Х	Х	Х	Q	V	Till/Bedrock
416	NBT/P001	North	Х	Х	Х	Х	Q	V	Till/Bedrock
418	NBT/P001	North	NA	NA	NA	Х	Q	V	Alluvial Zone
521	MT	North	Х	Х	Х	Х	Q	GMP	Till/Bedrock
522	MT	North	Х	Х	Х	Х	Q	GMP	Till/Bedrock
524	MT	North	Х	Х	Х	Х	Q	GMP	Till/Bedrock
529	MT	North	Х	Х	Х	Х	Q	GMP	Alluvial Silt, Sand, Gravel
532	MT	North	Х	Х	Х	Х	Q	GMP	Alluvial Silt, Sand, Gravel
534	MT	North	Х	Х	Х	Х	Q	GMP	Alluvial Silt, Sand, Gravel
540	SBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
541	SBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
542	SBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
543	SBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
601	NBT/P001	North	X		Х		S	V	Alluvial Silt, Sand, Gravel
602	NBT/P001	North	Х		Х		S	V	Alluvial Silt & Sand
603	NBT/P001	North	Х		Х		S	GMP	Alluvial Sand & Gravel
604	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt & Sand
605	NBT/P001	North			Х		Α	GMP	Till/Bedrock
606	NBT/P001	North	Х	Х	Х	Х	Q	GMP	Alluvial Silt, Sand, Gravel
607	NBT/P001	North	Х	Х	Х	Х	Q	GMP	Till/Bedrock
608	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt, Sand, Gravel
609	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
610	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
611	NBT/P001	North	Х		Х		S	GMP	Fill/Alluvial Sand & Silt
612	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
613	NBT/P001	North	Х		Х		S	GMP	Alluvial Silt, Sand, Gravel
614	WBA	South				Х	Α	GMP	Till/Bedrock
615	NBT/P001	North			Х		Α	GMP	Bedrock
616	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
617	NBT/P001	North	Х		Х		S	GMP	Till/Bedrock
618	TFA	North	X		X		S	GMP	Till/Bedrock

Former Owego, New York Facility 2018 Groundwater Sampling Plan

			Northern	Southern	Northern	Southern			
			Area Focus	Area Focus	Area Focus	Area Focus			
Well	Site Area	Site	First	Second	Third	Fourth	Sampling	Пиодион	Unit Monitored
weii	Site Area	Region	Quarter*	Quarter*	Quarter	Quarter	Frequency	Program	Onit Monitorea
619	TVD/MLA	South				Х	Α	GMP	Till/Bedrock
620	TVD/MLA	South		Х		Х	S	GMP	Alluvial Sand & Gravel/Till
621	TVD/MLA	South		Х		Х	S	GMP	Outwash Sand & Gravel
622	TVD/MLA	South		Х		Х	S	GMP	Till/Bedrock
623	TVD/MLA	South				Х	Α	V	Fill/Alluvial Sand & Silt
624	TVD/MLA	South				Х	Α	V	Till/Bedrock
625	SBA	South	Х	Х	Х	Х	Q	GMP	Outwash Sand & Gravel
626	SBA	South		Х		Х	S	GMP	Till/Bedrock
627	SBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
628	SBA	South				Х	Α	V	Till/Bedrock
629	WBA	South				Х	Α	V	Outwash Silt, Sand, Gravel
630	WBA	South				Х	Α	V	Till/Bedrock
631	WBA	South		Х		Х	S	GMP	Outwash Sand & Gravel
632	WMA	South		Х		Х	S	GMP	Till/Bedrock
700	NBT/P001	North	NA	Х		Х	TBA	٧	Till/Bedrock
701	NBT/P001	North	NA	Х		Х	TBA	V	Till/Bedrock
P04	TFA	North			Х		Α	GMP	Till
P08	TVD/MLA	South				Х	Α	GMP	Till?
P11	TVD/MLA	South				Х	Α	GMP	Till?
	San	nple Count:	53	60	71	83	Total:	267	

Key:

Northern Area wells are shaded gray.

* Designates a semiannual (partial) sampling event without the annual wells.

X = Collect sample MT = Moore Tire Area (off-site)

NA = Well not available NBT/P001 = NW Bedrock Trough/P001 Area

Q = Quarterly frequency SBA = Southern Boundary Area (some off-site)

S = Semiannual frequency TFA = Tank Farm Area

A = Annual frequency TVD/MLA = Tower View Drive/Mirror Lake Area

GMP = Groundwater Monitoring Program Well WBA = Western Boundary Area
V = Voluntary Sampling Well WMA = Waste Management Area

APPENDIX E

Chains of Custody

2018

Environmental	Acct. # X	O-LIV	Gro	up # [nti ox) r		San	mple i	circled m.	ntal use on US Q umbers					C	OC # (
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Le PFAS Samply 9	300 L	OEI			П	00			H							Preserv	ation Codes
BM 1 1110	Project Sty	ite							1/54						11/9	H=HC)	T = Thiosulfate
Drandon History	Sampley		_	-	ent	Ground		П	=						- 10	$N = HNO_3$ $S = H_2SO_4$	B = NaOH O = Other
TAC63 abri 91 -	1/4	ZINC			Sediment	S. G.			25							Re	emarks
r Compliance: X Yes No				-	Š			100	IL					1 1			
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Non-Routine Investigation		tine Upgrade		alls	M	Potable NPDES	Air	onta	K				H R				
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JO 198 1800 J. B.	NEK	937	X			Gul		3	X					\Box			
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te results are needed: (Q13c)	_	Relinquistred	nv.		/		Date		_	Time		Receive	1.hv			Date	Time
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pe III (Reduced NJ		ASP B				spec	ific QC (MS/M	ISD/I	~			T					- (5 . 3
pe VI (Raw Data O			4		Yes				(No)				T	empe	rature	upon	receipt .	
DG Complete?	Yes (No)		aboratories.				ample ar												0.7

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Eurofins Lancaster Laboratories Environmental	Acct.#_ 69	III Fo	or Eurofins _ Group # Instruc	Lanca 人。 ions on	ister La 1.64 reverse si	borat 15 ide com	ories E Samp espond	Environ ble #_ with circle	mental :	ise only 3 ∞ (7-28					019384
Client Information					Mat	rix			Analyses Requested					For Lab Use Only		
IBM CEP Owego	6911						٦			F	reserv	ation C	ode			•
echanicia POP Study	SSOW#	3p		-	, ,			11330							(H = HC)	ervation Codes T = Thiosulfate
CARG3004,39	Sampler DON	2		Sediment	Ground	Surface		xcm 12.3							$N = HNO_3$ $S = H_2SO_2$	B = NaOH O = Other Remarks
eck One: Routine Lab GW	Routine GT	FO&M		ő				ı۶	,							
Non-Routine Investigation	Non-Routing				Potable	NPDES	□ Air	or containers								
Sample Identification	Colle Date	cted Time	Grab Sa Composite	Soil	Water		lio I	± >-								
04017 18 1940 Y 04017 18 1940 P 04017 18 1940 P	12K4/8	854 903 909 938	X V		\$\frac{1}{\frac{1}{2}}	NI		3 X 1 1	4							
Turnaround Time Requested (TAT) (pla	ease circle)	(ellingula hed/by				13/	(o)	8	Time	000	Recei	red by			Date	Time
tush TAT is subject to Lancaster suboratories approval e results are needed: []] 55		Relinquished by			_	Ďá	ate /		Time Time	-y	Recei	ed by			Date Date	Time
Data Package Options (please circle if required) ppe I (Validation/NJ Reg) TX TRRP-13 NY ASP A ppe III (Reduced NJ) MA MCP NY ASP B Sif				sneci	specific QC (MS/MSD/Dup				Time Received by				Date 12 - 7-18	1020		
ype VI (Raw Data Only) CT RCP Yes				QC sample and submit triplicate volume.)										5 ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° ° °		

APPENDIX F

Groundwater Analytical Chemistry Data for Extraction and Monitoring Wells

January 1, 2018 – December 31, 2018

Groundwater Analytical Chemistry Data Owego, New York

January 1, 2018 - December 31, 2018

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		101 GW MON WELL 06/07/2018 9651318 P	101 GW MON WELL 11/27/2018 9917440 P	106 GW MON WELL 07/16/2018 9715259 P	107A GW MON WELL 02/27/2018 9483458 P	107A GW MON WELL 06/07/2018 9651331 P	107A GW MON WELL 07/16/2018 9715260 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.59 355 9.8 0.38	8.17 319 9.3 0.89	7.37 640 19.8 0.26	6.82 331 11.1 0.39	8.42 316 11.6 0.88	7.87 299 13.1 0.25
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHANE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 0.1 J ND@0.5 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Groundwater Analytical Chemistry Data Owego, New York

January 1, 2018 - December 31, 2018

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		107A GW MON WELL 11/28/2018 9917510	110 GW MON WELL 02/27/2018 9483459 P	110 GW MON WELL 07/17/2018 9715261 P	120 GW MON WELL 06/07/2018 9651329 P	120 GW MON WELL 11/28/2018 9917514 P	124 GW MON WELL 02/27/2018 9485197 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.56 360 10.4 0.64	7.41 11240 10.2 0.63	6.98 4934 17.2 0.52	7.12 1165 13.1 0.17	6.73 1457 10 0.65	7.73 1380 7.2 1.07
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2 ND@0.5 ND@0.5 1.7 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	9.6 ND@0.5 ND@0.5 2.5 0.8 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		124 GW MON WELL 07/17/2018 9715262 P	125 GW MON WELL 02/27/2018 9483460 P	125 GW MON WELL 07/17/2018 9715264 P	127 GW MON WELL 02/27/2018 9485198 P	127 GW MON WELL 07/17/2018 9715263 P	128 GW MON WELL 02/07/2018 9449908 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.83 1221 21.1 0.36	8.04 7630 10.3 0.62	7.9 128 19.1 1	6.93 4110 6.6 0.49	7.35 4633 19.2 0.61	6.63 5382 13 1.04
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	1 ND@0.5 ND@0.5 14 0.2 J 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.7 ND@0.5 ND@0.5 3.5 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	46 ND@0.5 ND@0.5 2.5 3 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	41 ND@0.5 ND@0.5 2.7 4 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.1 J 1.2 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3000 280 8.7 J 420 1000 ND@10 3.3 J ND@10 ND@10 750 ND@10 ND@10 8.5 J 620 ND@10 9.3 J

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		128 GW MON WELL 07/17/2018 9715271 P	129 GW MON WELL 02/27/2018 9483457 P	129 GW MON WELL 07/16/2018 9715257 P	132 GW MON WELL 07/16/2018 9715255 P	133 GW MON WELL 06/07/2018 9649964 P	133 GW MON WELL 12/04/2018 9928698 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.15 2441 18 0.94	8.14 30150 5.7 17.9	7.73 748 25.8 0.83	7.57 339 17.7 0.55	6.83 6527 13.4 0.12	6.45 3999 13.2 2.99
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	250 24 1.6 J 45 74 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5	0.5 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	79 2 ND@0.5 100 17 1.7 0.3 J 0.2 J 0.1 J 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.2 J	74 1.5 ND@0.5 99 15 1.5 0.4 J 0.2 J 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.2 J

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		134 GW MON WELL 02/27/2018 9483455 P	134 GW MON WELL 07/16/2018 9715254 P	140R GW MON WELL 07/18/2018 9715309 P	146 GW MON WELL 02/28/2018 9485205 P	146 GW MON WELL 07/19/2018 9714843 P	148 GW MON WELL 06/07/2018 9651327 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	8.08 452 17.1 0.78	7.95 393 20.7 0.67	6.55 1514 14.1 4.44	7.93 2990 7.7 0.87	7.06 2522 16.7 0.97	6.68 780 13.8 0.34
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	64 15 ND@0.5 120 14 3 ND@0.5 0.2 J ND@0.5 6.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.3 J ND@0.5 ND@0.5 1.1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	110 1 J 0.8 J 1.4 J 8.7 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		148 GW MON WELL 11/28/2018 9917513 P	149 GW MON WELL 06/07/2018 9651330 P	149 GW MON WELL 11/28/2018 9917515 P	157 GW MON WELL 02/28/2018 9485194 P	157 GW MON WELL 07/18/2018 9715316 P	158 GW MON WELL 11/27/2018 9917450 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.42 889 11.6 0.82	7.14 1035 12.2 0.44	6.82 1323 11.1 0.5	6.84 134 6.4 0.7	7.25 505 12.2 0.94	6.19 143 10.7 0.9
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	190 2.2 J 1.1 J 2 J 13 ND@2.5 0.3 J ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5	2.2 ND@0.5 ND@0.5 12 3 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	5 ND@0.5 ND@0.5 23 7.1 ND@0.5 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.5 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.09 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		160 GW MON WELL 06/07/2018 9649962 P	160 GW MON WELL 11/28/2018 9917462 P	162 GW MON WELL 06/07/2018 9651324 P	162 GW MON WELL 11/27/2018 9917447 P	163 GW MON WELL 11/27/2018 9917448 P	165 GW MON WELL 06/07/2018 9651323 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.88 557 13.4 0.29	7.52 657 5.4 0.75	7.38 440 14.7 0.15	7.54 548 8.6 0.85	7 356 10.9 0.94	7.62 259 15.7 0.22
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	38 ND@1 ND@1 3.7 10 ND@1 ND@1 ND@1 ND@1 ND@1 ND@1 ND@1 ND@1	47 0.4 J ND@0.5 4.7 13 ND@0.5 0.09 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	18 ND@0.5 ND@0.5 2.3 5.7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	50 0.5 ND@0.5 12 18 0.09 J 0.07 J 0.2 J ND@0.5 85 ND@0.5 ND@0.5 0.3 J 63 ND@0.5 0.4 J	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	38 ND@2.5 ND@2.5 4.4 14 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		165 GW MON WELL 11/27/2018 9917446 P	166 GW MON WELL 06/06/2018 9649953 P	166 GW MON WELL 12/04/2018 9928608 P	167 GW MON WELL 06/06/2018 9649954 P	167 GW MON WELL 12/04/2018 9928610 P	178 GW MON WELL 06/07/2018 9651321 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.76 214 5.5 0.82	7.62 540 11.4 0.45	7.54 492 10.8 3.2	7.69 352 9.4 0.53	6.72 384 9.6 1.48	6.17 2383 12.7 0.44
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	22 0.3 J ND@0.5 7 2.1 0.07 J 0.07 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J 0.5 ND@0.5 1.6 0.2 J 1.2 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.3 J 0.9 ND@0.5 1.8 0.3 J 1.3 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 O.3 J	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.06 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	23 0.5 J ND@0.5 14 3.5 ND@0.5 ND@0.5 ND@0.5 0.2 J 6.9 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		178 GW MON WELL 11/27/2018 9917443 P	179 GW MON WELL 06/07/2018 9651320 P	179 GW MON WELL 11/27/2018 9917442 P	181 GW MON WELL 02/07/2018 9449909 P	181 GW MON WELL 11/27/2018 9917453 P	183 GW MON WELL 02/07/2018 9449910 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU	6.44	6.99	6.73	7.88	6.79	7.24
	umhos/cm	1616	398	455	745	541	588
	C	7.9	9.1	10.7	7.7	11.3	10.4
	NTU	0.66	0.18	0.77	1.44	1.01	0.55
Volatile Organics							
1,1,1-TRICHLOROETHANE	ug/L	28	16	19	5.8	3.6	7.9
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	0.5 J	3.5	110	ND@0.5	0.06 J	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@1.0	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE 1,1-DICHLOROETHANE 1,2-DICHLORO 1,2-2 TRIELLIOROETHANE	ug/L	11	3	11	1.2	0.7	2.5
	ug/L	3.3	6	7.3	ND@0.5	0.06 J	0.5 J
	ug/L	0.1 J	0.3 J	27	ND@0.5	0.1 J	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE	ug/L	0.07 J	ND@0.5	0.2 J	ND@0.5	ND@0.5	ND@0.5
	ug/L	ND@0.5	ND@0.5	ND@1.0	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	0.2 J	0.2 J	0.3 J	ND@0.5	ND@0.5	0.9
	ug/L	7.5	11	560	ND@0.5	ND@0.5	70
	ug/L	ND@0.5	ND@0.5	ND@1.0	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@1.0	ND@0.5	ND@0.5	ND@0.5
	ug/L	0.4 J	0.1 J	ND@1.0	ND@0.5	ND@0.5	ND@0.5
	ug/L	90	61	11	0.9	0.8	160
TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L	ND@0.5 ND@0.5	ND@0.5 ND@0.5	ND@1.0 5.9	0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5	ND@0.5 0.3 J

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		183 GW MON WELL 06/07/2018 9651328 P	183 GW MON WELL 11/27/2018 9917451 P	185 GW MON WELL 06/08/2018 9651336	185 GW MON WELL 12/04/2018 9928615	186 GW MON WELL 06/08/2018 9651337	186 GW MON WELL 12/04/2018 9928614
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.99 474 13.7 0.72	6.25 537 11.9 0.89	7.42 817 11.7 0.95	7.1 1095 10.6 2.47	7.01 1852 12.1 0.98	6.6 2304 10.3 7.83
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	6 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5 ND@2.5	8.7 ND@2.5 ND@2.5 1.2 J ND@2.5 ND@2.5 ND@2.5 1.5 J 32 ND@2.5 ND@2.5 ND@2.5 ND@2.5	1.8 1.2 ND@0.5 0.7 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3.1 4.3 ND@0.5 1.9 0.4 J 0.9 0.2 J ND@0.5 0.2 J 2.3 ND@0.5 ND@0.5 ND@0.5	7.9 18 ND@1 5.8 0.9 J 2 ND@1 ND@1 0.4 J 8.3 ND@1 ND@1 ND@1 ND@1 110	13 27 ND@1.0 8.6 1.3 2.9 0.2 J ND@1.0 0.6 J 13 ND@1.0 ND@1.0 ND@1.0
TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L	ND@2.5 ND@2.5	ND@2.5 ND@2.5	20 ND@0.5 ND@0.5	ND@0.5 ND@0.5	ND@1 ND@1	ND@1.0 ND@1.0

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		194 GW MON WELL 06/08/2018 9651335	194 GW MON WELL 12/05/2018 9928616	306 GW MON WELL 12/03/2018 9928679	308 GW MON WELL 06/07/2018 9649965 P	308 GW MON WELL 12/04/2018 9928700 P	309 GW MON WELL 06/07/2018 9649966 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.42 897 13 104	7.26 972 12 324	6.5 1456 9 2.48	6.95 2504 11.8 0.13	6.52 2812 11.3 12.7	6.41 4573 11.9 0.15
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 1.5 2.4 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3.5 0.06 J ND@0.5 8.8 2.2 ND@0.5 ND@0.5 0.2 J ND@0.5 0.06 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.09 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	45 1.1 ND@0.5 37 4.5 0.5 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	120 2.5 ND@0.5 120 14 1.5 0.3 J 0.1 J 0.2 J 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2.2 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		309 GW MON WELL 12/04/2018 9928697 P	313 GW MON WELL 02/14/2018 9463778 P	313 GW MON WELL 12/04/2018 9928696 P	314 GW MON WELL 11/27/2018 9917441 P	316 GW MON WELL 06/06/2018 9649952 P	316 GW MON WELL 12/04/2018 9928609 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.54 1462 11.3 3.47	7.23 1520 10.9 1	6.92 1344 10.4 1.32	7.46 371 10 1.11	7.8 450 12.2 0.64	7.96 486 10.7 2.21
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.9 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.4 J ND@0.5 ND@0.5 2.4 0.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 2.9 0.7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 1.1 0.5 J ND@0.5 0.07 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		317 GW MON WELL 06/07/2018 9649961 P	317 GW MON WELL 11/28/2018 9917461 P	318 GW MON WELL 02/26/2018 9483432 P	318 GW MON WELL 06/07/2018 9651315 P	318 GW MON WELL 07/18/2018 9715311 P	318 GW MON WELL 11/27/2018 9917436 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.64 562 13.7 0.56	7.84 558 6.1 0.54	7.72 414 9.7 0.52	7.28 378 9.6 0.42	7.21 398 10.1 0.71	8.26 424 10.6 0.59
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	38 ND@1 ND@1 3.7 12 ND@1 ND@1 ND@1 ND@1 ND@1 0.3 J 170 ND@1 ND@1	48 0.2 J ND@1.0 4.7 12 ND@1.0 0.1 J ND@1.0 ND@1.0 28 ND@1.0 ND@1.0 ND@1.0 ND@1.0 ND@1.0 ND@1.0 ND@1.0 ND@1.0 ND@1.0 ND@1.0	ND@0.5 2.5 ND@0.5 3.2 0.9 10 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.6	ND@0.5 2.4 ND@0.5 2.8 0.7 9 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 2.7 ND@0.5 2.9 0.9 8.7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 2.6 ND@0.5 2.6 0.7 7.8 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		319 GW MON WELL 02/26/2018 9483434 P	319 GW MON WELL 06/07/2018 9651317 P	319 GW MON WELL 07/18/2018 9715313 P	319 GW MON WELL 11/27/2018 9917439 P	321 GW MON WELL 06/07/2018 9649963 P	321 GW MON WELL 12/04/2018 9928693 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.59 421 7.6 0.97	7.48 445 9.3 0.33	7.34 418 11.3 0.48	8.94 230 8.7 0.88	6.82 918 11.3 0.27	6.8 281 14 1
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 0.5 ND@0.5 1.2 0.2 J 1.8 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 12	ND@0.5 0.4 J ND@0.5 0.6 0.1 J 1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 0.6 ND@0.5 0.7 0.1 J 0.9 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.2 J	ND@0.5 0.3 J ND@0.5 0.6 0.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2.5 ND@0.5 ND@0.5 1.3 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	4 ND@0.5 ND@0.5 1.9 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		322 GW MON WELL 02/26/2018 9483433 P	322 GW MON WELL 06/07/2018 9651316 P	322 GW MON WELL 07/18/2018 9715312 P	322 GW MON WELL 11/27/2018 9917437 P	323 GW MON WELL 02/26/2018 9483435 P	323 GW MON WELL 06/07/2018 9651319 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.09 429 6.7 0.46	7.49 382 9.8 0.49	7.22 387 11.7 0.21	7.45 354 9.6 0.42	6.95 246 9.6 0.63	6.81 211 9.5 0.5
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 1.1 ND@0.5 1.1 0.3 J 1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 OND@0.5	ND@0.5 0.3 J ND@0.5 0.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		323 GW MON WELL 07/18/2018 9715314 P	323 GW MON WELL 11/27/2018 9917438 P	324 GW MON WELL 02/28/2018 9485208 P	324 GW MON WELL 07/18/2018 9715306 P	325 GW MON WELL 02/28/2018 9485209 P	325 GW MON WELL 07/18/2018 9715307 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.41 218 9.9 0.8	6.05 270 10.3 0.47	6.66 6240 11.9 0.73	6.42 5837 13.5 6.11	5.72 6010 12.7 0.69	5.71 5298 12.8 15.9
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROETHENE	ug/L ug/L	ND@0.5 0.6 ND@0.5 0.7 0.2 J 0.8 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 0.4 J ND@0.5 0.3 J ND@0.5 0.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	180 6.5 1.3 J 83 99 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5	180 8.5 1.2 J 90 110 ND@5 ND@5 ND@5 ND@5 61 ND@5 ND@5 ND@5	120 4.8 0.9 J 62 69 1.2 J 0.6 J ND@2.5 ND@2.5 39 ND@2.5 1.6 J 6.2 330	140 J 7.9 0.9 J 65 74 1.4 J 0.5 J 0.5 J ND@2.5 48 ND@2.5 1.7 J 6.4 440 J
TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L	ND@0.5 ND@0.5	ND@0.5 0.5	ND@5 1.9 J	ND@5 2.3 J	ND@2.5 1.6 J	ND@2.5 1.8 J

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		351 GW MON WELL 06/08/2018 9651339	351 GW MON WELL 12/04/2018 9928612	352 GW MON WELL 12/04/2018 9928613	353 GW MON WELL 07/17/2018 9715269 P	354 GW MON WELL 07/17/2018 9715270	355 GW MON WELL 12/03/2018 9928685 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.34 663 10.8 71.4	6.84 652 9.1 136	6.84 652 9.1 136	7.94 191 20.5 0.4	7.71 105 18.9 407	7.68 276 11.9 1.47
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.2 J ND@0.5 ND@0.5 0.2 J 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.3 J ND@0.5 ND@0.5 0.3 J 0.2 J ND@0.5 0.06 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.1 J ND@0.5 ND@0.5 0.1 J 0.07 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	330 ND@5 ND@5 120 110 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		356 GW MON WELL 12/03/2018 9928686 P	357 GW MON WELL 02/28/2018 9485206 P	357 GW MON WELL 07/19/2018 9714839 P	358 GW MON WELL 07/19/2018 9714840 P	361 GW MON WELL 07/19/2018 9714846 P	362 GW MON WELL 12/03/2018 9928680 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.82 483 12.1 1.32	8.11 2090 7.7 0.5	7.41 1953 15.2 0.81	6.78 2405 17.1 2.01	7.3 980 16 0.56	6.92 314 10.9 0.78
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHANE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.4 J ND@0.5 ND@0.5 3.4 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 2.1 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	28 0.9 ND@0.5 14 4.6 0.7 ND@0.5 ND@0.5 0.1 J 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.1 J	3.2 ND@0.5 ND@0.5 5.4 0.8 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		363 GW MON WELL 02/14/2018 9463779 P	363 GW MON WELL 12/03/2018 9928682 P	364 GW MON WELL 07/17/2018 9715282 P	365 GW MON WELL 07/17/2018 9715292 P	366 GW MON WELL 07/18/2018 9715299	367 GW MON WELL 02/27/2018 9483446 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.37 4930 11.1 0.79	6.04 4115 11.3 1.13	7.27 1600 13.7 0.25	6.39 1696 13.2 0.3	6.51 1270 14.9 41.4	6.85 2320 13.2 0.7
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	1.2 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	43 0.7 ND@0.5 14 11 1.4 ND@0.5 ND@0.5 0.5 J 6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	73 3.5 0.1 J 13 24 1.2 0.1 J ND@0.5 0.6 5.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.6

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		367 GW MON WELL 07/17/2018 9715297 P	368 GW MON WELL 02/27/2018 9483447	368 GW MON WELL 07/17/2018 9715298	373 GW MON WELL 06/04/2018 9649943 P	373 GW MON WELL 12/03/2018 9928681 P	374 GW MON WELL 06/04/2018 9649941 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.41 2135 14.2 2.51	7.84 3300 13.7 0.54	6.37 2911 14.3 20	6.22 1056 10.5 0.46	6.22 954 11 0.83	7.47 437 9.8 0.77
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	71 3.3 0.1 J 12 23 1.2 0.1 J ND@0.5 0.6 5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.7	ND@0.5 ND@0.5 ND@0.5 5.5 0.3 J 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.7	ND@0.5 ND@0.5 ND@0.5 1 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3.1 ND@0.5 ND@0.5 0.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2.7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		374 GW MON WELL 12/03/2018 9928678 P	378 GW MON WELL 02/27/2018 9483445 P	378 GW MON WELL 06/07/2018 9651313 P	378 GW MON WELL 07/17/2018 9715293 P	378 GW MON WELL 11/28/2018 9917509 P	379 GW MON WELL 07/17/2018 9715294 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.22 733 9.3 1.02	7.46 1990 12.2 0.87	6.51 1761 12.7 0.34	6.91 1693 13.2 0.26	6.38 2045 10.2 0.67	6.8 1709 13.2 0.85
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	480 50 ND@10 840 76 19 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 93 ND@10 28	240 9.7 J ND@10 670 41 12 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 A3 ND@10 18	170 5.9 ND@5 590 28 11 ND@5 1.2 J ND@5 60 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 23 ND@5 27	620 57 ND@5.0 920 81 16 0.7 J 1.1 J ND@5.0 120 ND@5.0 ND@5.0 ND@5.0 ND@5.0 140 ND@5.0	1.2 ND@0.5 ND@0.5 4.3 0.4 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		379 GW MON WELL 12/06/2018 9930022 P	382 GW MON WELL 07/18/2018 9715300 P	383 GW MON WELL 02/28/2018 9485187 P	383 GW MON WELL 07/19/2018 9714844 P	386 GW MON WELL 11/27/2018 9917444 P	387 GW MON WELL 11/27/2018 9917445 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.48 2149 10 1.33	7.29 366 15.7 11.8	6.81 2560 6.3 0.38	7.18 2196 15.2 0.63	6.15 509 9.8 0.68	6.85 240 6 0.86
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	4.8 0.6 ND@0.5 10 0.8 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 O.3 J ND@0.5 0.2 J	0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2 ND@0.5 ND@0.5 0.4 J 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2.1 ND@0.5 ND@0.5 0.4 J 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	18 0.3 J ND@0.5 21 12 ND@0.5 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		392 GW MON WELL 02/28/2018 9485207 P	392 GW MON WELL 07/18/2018 9715305 P	393 GW MON WELL 02/27/2018 9483442	393 GW MON WELL 06/08/2018 9651338	393 GW MON WELL 07/17/2018 9715277	393 GW MON WELL 12/05/2018 9928617
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.47 3170 11.6 0.6	7.26 1623 13.1 10	7.59 3060 12.6 0.62	7.11 2714 14 2.78	7.23 2531 16.6 8.2	6.63 2836 12.3 391
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11)	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.6 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	690 71 ND@5 940 80 15 ND@5 1 J ND@5 120 ND@5 ND@5 ND@5	590 55 ND@10 860 76 15 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10	700 87 ND@5 910 92 18 ND@5 1.5 J ND@5 130 ND@5 ND@5 ND@5	560 70 ND@5.0 820 80 14 0.6 J 1.1 J ND@5.0 120 ND@5.0 ND@5.0 ND@5.0 ND@5.0
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	12	13	16	16

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		394 GW MON WELL 02/27/2018 9483453 P	394 GW MON WELL 07/18/2018 9715304 P	394 GW MON WELL 12/06/2018 9930023 P	395 GW MON WELL 07/18/2018 9715308 P	395 GW MON WELL 12/06/2018 9930024 P	397 GW MON WELL 07/18/2018 9715318 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.6 4110 12.4 0.8	6.42 3300 12.9 12.2	6.26 4052 10.4 1.19	7.12 2427 13.1 4.81	6.89 3010 11.7 1.24	7.23 586 12.5 0.83
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	1100 78 ND@10 1100 84 18 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 14	780 120 ND@10 1,000 100 21 ND@10 2.4 J ND@10 120 ND@10 ND@10 ND@10 ND@10 190 ND@10	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		397 GW MON WELL 12/06/2018 9930020 P	398 GW MON WELL 02/28/2018 9485192 P	398 GW MON WELL 07/18/2018 9715319 P	398 GW MON WELL 12/06/2018 9930021 P	399 GW MON WELL 02/27/2018 9483438 P	399 GW MON WELL 06/06/2018 9649958 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.01 740 8.7 4.09	7.1 359 6.5 0.47	6.97 893 12 1.99	6.37 333 8.6 3.53	6.77 2640 5.7 1.3	6.91 1821 14.3 0.62
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	5.3 ND@0.5 ND@0.5 4.3 1.4 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	4.3 ND@0.5 ND@0.5 6.8 3.2 0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.5 J 0.2 J ND@0.5 13 4.1 0.6 0.06 J 0.5 J ND@0.5 1.3 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		399 GW MON WELL 07/17/2018 9715278 P	399 GW MON WELL 11/27/2018 9917456 P	404 GW EXTR WELL 03/01/2018 9485211	404 GW EXTR WELL 06/08/2018 9651256	404 GW EXTR WELL 07/19/2018 9714852	404 GW EXTR WELL 11/28/2018 9917516
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.54 1898 17 0.74	6.78 1463 8.2 0.83	7.1 1250 12.1 11.7	7.54 1238 14.5 9.13	7.22 1290 13 3.85	7.22 1424 9 0.61
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	5.4 19 ND@0.5 4.2 1.1 5.5 ND@0.5 ND@0.5 0.7 27 ND@0.5 ND@0.5	5 19 ND@0.5 4.2 1 5.8 ND@0.5 ND@0.5 0.7 29 ND@0.5 ND@0.5	5.6 29 ND@0.5 4.7 1.2 6.8 ND@0.5 ND@0.5 ND@0.5 ND@0.5	6.6 40 ND@0.5 4.9 1.2 6.9 0.1 J ND@0.5 1.2 30 ND@0.5 ND@0.5
TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L	ND@0.5 0.2 J ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.1 J 120 ND@0.5 0.2 J	0.2 J 120 ND@0.5 0.2 J	0.1 J 140 ND@0.5 0.3 J	0.2 J 140 ND@0.5 0.2 J

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		405 GW EXTR WELL 03/01/2018 9485212	405 GW EXTR WELL 06/08/2018 9651255	405 GW EXTR WELL 07/19/2018 9714853	405 GW EXTR WELL 11/28/2018 9917517	413 GW EXTR WELL 03/01/2018 9485215	413 GW EXTR WELL 06/08/2018 9651253
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.86 880 9.9 7.3	7.42 757 9.9 6.37	7.36 743 11.6 1.97	6.73 631 11.7 0.61	7.03 2820 12.7 7.97	6.91 2842 14.9 2.81
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11)	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	19 35 ND@0.5 6 4.7 2.8 ND@0.5 ND@0.5 0.2 J 21 ND@0.5 ND@0.5 ND@0.5	13 30 ND@0.5 4.7 3.7 2.7 ND@0.5 ND@0.5 0.1 J 20 ND@0.5 ND@0.5 ND@0.5	17 45 ND@0.5 5.5 4.9 3.1 ND@0.5 ND@0.5 0.2 J 24 ND@0.5 ND@0.5 ND@0.5	15 31 ND@0.5 4.1 3.5 2.5 0.06 J ND@0.5 0.1 J 23 ND@0.5 ND@0.5 0.4 J 90 ND@0.5	42 5.3 ND@0.5 88 15 1.7 0.1 J 0.2 J ND@0.5 14 ND@0.5 ND@0.5 0.2 J 43 ND@0.5	33 4.5 ND@0.5 78 15 1.6 0.1 J 0.2 J ND@0.5 15 ND@0.5 ND@0.5 0.1 J 39 ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	0.8	1

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		413 GW EXTR WELL 07/19/2018 9714849	413 GW EXTR WELL 12/05/2018 9928622	414 GW EXTR WELL 03/01/2018 9485216	414 GW EXTR WELL 06/08/2018 9651254	414 GW EXTR WELL 07/19/2018 9714850	415 GW EXTR WELL 03/01/2018 9485214
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.51 2790 14 1.89	6.25 3285 12.4 31.8	7.19 3640 11.7 27.7	6.9 3611 14.7 138	6.5 3522 13.6 37.9	7.47 5050 15.1 17.2
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE	ug/L	38 4.7 ND@0.5 87 17 1.8 0.1 J 0.3 J ND@0.5 17 ND@0.5 ND@0.5	41 4.5 0.1 J 93 19 1.9 0.2 J 0.3 J 0.1 J 24 ND@0.5 ND@0.5	620 81 ND@5 1400 79 31 ND@5 1.3 J ND@5 79 ND@5 ND@5	350 42 ND@10 1100 57 21 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10	450 67 ND@5 1300 68 28 ND@5 1.6 J ND@5 78 ND@5 ND@5 ND@5	940 64 ND@25 910 720 ND@25 ND@25 ND@25 ND@25 ND@25 ND@25 ND@25
TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L	43 ND@0.5 1.2	63 ND@0.5 0.8	280 ND@5 9.6	230 ND@10 7.9 J	280 ND@5 11	1100 ND@25 84

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		415 GW EXTR WELL 06/08/2018 9651250	415 GW EXTR WELL 07/19/2018 9714847	415 GW EXTR WELL 12/05/2018 9928623	416 GW EXTR WELL 03/01/2018 9485217	416 GW EXTR WELL 06/08/2018 9651251	416 GW EXTR WELL 07/19/2018 9714851
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.05 5348 16.4 3.15	6.9 4981 15.7 1.17	6.58 5162 14.2 9.89	7.55 3010 12.4 437	6.82 3010 14.7 510	6.62 3543 13.9 99.3
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROETHENE	ug/L ug/L	800 60 ND@25 800 680 ND@25 ND@25 ND@25 2200 ND@25 ND@25 ND@25	1100 120 ND@25 870 840 ND@25 ND@25 ND@25 ND@25 1900 ND@25 ND@25 ND@25	1,200 110 4.1 J 920 830 6.7 J 4.7 J ND@25 ND@25 2,000 ND@25 ND@25 ND@25 ND@25	560 39 ND@5 880 63 11 ND@5 1.5 J ND@5 93 ND@5 ND@5 ND@5	150 18 ND@5 380 30 7.4 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5	440 68 ND@5 1200 69 27 ND@5 1.6 J ND@5 78 ND@5 ND@5 1.4 J 270
TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L	ND@25 91	ND@25 120	ND@25 120	ND@5 6.2	ND@5 3.1 J	ND@5 11

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		416 GW EXTR WELL 12/05/2018 9928621	418 GW EXTR WELL 12/05/2018 9928620	521 GW MON WELL 02/27/2018 9483441 P	521 GW MON WELL 06/06/2018 9649956 P	521 GW MON WELL 07/17/2018 9715280 P	521 GW MON WELL 11/27/2018 9917458 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.5 3439 11.9 53.6	6.29 3208 11.4 178	7.41 2780 7.3 0.73	7.07 1932 14.5 0.48	6.81 2060 20.9 0.34	6.88 3048 11 0.71
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	370 41 ND@5.0 720 80 12 0.7 J 1.3 J ND@5.0 97 ND@5.0 ND@5.0 ND@5.0 1.4 J 280 ND@5.0 7.9	270 36 ND@5.0 610 63 14 0.6 J 1 J ND@5.0 83 ND@5.0 ND@5.0 2.7 J 350 ND@5.0 5.5	85 7 ND@2.5 370 15 6.1 ND@2.5 1 J ND@2.5 22 ND@2.5 ND@2.5 ND@2.5 ND@2.5 2.3 J ND@2.5	92 7.6 ND@5 460 8.4 8.4 ND@5 1.6 J ND@5 ND@5 ND@5 ND@5 ND@5	130 8.2 ND@5 600 23 11 ND@5 3.4 J ND@5 40 ND@5 ND@5 ND@5 ND@5 ND@5 A.9 J ND@5 23	140 11 ND@5.0 560 33 8.4 ND@5.0 2 J ND@5.0 42 ND@5.0 ND@5.0 ND@5.0 ND@5.0 7.4 ND@5.0 14

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		522 GW MON WELL 02/27/2018 9483437 P	522 GW MON WELL 06/06/2018 9649957 P	522 GW MON WELL 07/17/2018 9715281 P	522 GW MON WELL 11/27/2018 9917459 P	524 GW MON WELL 02/28/2018 9485203 P	524 GW MON WELL 06/06/2018 9649950 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.13 2800 7 0.48	7.08 2741 18 0.47	6.94 2485 21.4 0.37	7.48 3104 7 0.93	7.17 2070 8 0.73	6.84 2077 13.5 0.73
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE	ug/L ug/L	180 17 ND@2.5 500 35 8.6 ND@2.5 0.9 J ND@2.5 43 ND@2.5 ND@2.5 ND@2.5 ND@2.5	160 21 ND@2.5 490 38 9.4 ND@2.5 1.3 J ND@2.5 45 ND@2.5 ND@2.5 ND@2.5	200 24 ND@2.5 550 41 10 ND@2.5 1.4 J ND@2.5 49 ND@2.5 ND@2.5 ND@2.5	240 26 ND@2.5 570 42 9.8 ND@2.5 1.2 J ND@2.5 55 ND@2.5 ND@2.5 ND@2.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5
TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L	ND@2.5 7	ND@2.5 8.9	ND@2.5 10	ND@2.5 10	ND@0.5 ND@0.5	ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		524 GW MON WELL 07/19/2018 9714841 P	524 GW MON WELL 12/04/2018 9928704 P	529 GW MON WELL 02/27/2018 9483440 P	529 GW MON WELL 06/06/2018 9649955 P	529 GW MON WELL 07/17/2018 9715279 P	529 GW MON WELL 11/27/2018 9917457 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.45 1949 16.5 1.1	7.24 2331 8.5 98.1	7.49 1710 6.5 0.54	6.97 1751 14.8 0.55	6.95 1544 19.5 0.81	6.86 2417 10.1 1.85
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		532 GW MON WELL 02/28/2018 9485204 P	532 GW MON WELL 06/06/2018 9649951 P	532 GW MON WELL 07/19/2018 9714842 P	532 GW MON WELL 12/04/2018 9928705 P	534 GW MON WELL 02/27/2018 9483439 P	534 GW MON WELL 06/06/2018 9649959 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	8.06 1530 7.8 0.27	6.66 1623 12.6 0.92	6.92 1245 17 1.1	6.84 1947 9 1.71	7.46 2730 7.9 0.52	6.94 2417 17.5 1.02
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1.8 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	4.7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	5.5 ND@0.5 ND@0.5 2.2 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	7.2 0.1 J ND@0.5 3.6 0.1 J 0.09 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		534 GW MON WELL 07/17/2018 9715276 P	534 GW MON WELL 11/27/2018 9917455 P	540 GW MON WELL 06/04/2018 9649947 P	540 GW MON WELL 12/03/2018 9928689 P	541 GW MON WELL 06/04/2018 9649948 P	541 GW MON WELL 12/03/2018 9928690 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.3 2349 22.7 0.88	6.9 2810 11.4 1.06	7.39 758 10.3 0.17	7.24 900 10.9 1.13	7.31 792 11.2 0.32	7.29 961 12.3 1.98
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHANE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		542 GW MON WELL 06/04/2018 9649949 P	542 GW MON WELL 12/03/2018 9928691 P	543 GW MON WELL 06/04/2018 9649946 P	543 GW MON WELL 12/03/2018 9928687 P	601 GW MON WELL 02/28/2018 9485188 P	601 GW MON WELL 07/19/2018 9714838 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.84 1261 11.5 0.86	7.68 189 10.1 1.24	6.76 1446 11.4 0.19	6.47 1439 11.8 1.06	7.67 2310 5.7 0.59	6.9 1915 19.4 1.88
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 1.1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 1.4 ND@0.5 0.07 J ND@0.5 1.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		602 GW MON WELL 02/28/2018 9485190 P	602 GW MON WELL 07/18/2018 9715320 P	603 GW MON WELL 02/28/2018 9485193 P	603 GW MON WELL 07/18/2018 9715317 P	604 GW MON WELL 02/28/2018 9485196 P	604 GW MON WELL 07/18/2018 9715302 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.71 657 7.2 0.66	7.08 843 16.3 1.58	7.04 189 5.9 0.93	6.88 963 12.9 0.79	7.1 2870 10.8 0.89	6.11 3082 14.4 7.13
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHANE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1 ND@0.5 ND@0.5 ND@0.5 0.4 J 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2.8 ND@0.5 ND@0.5 0.8 0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.4 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		605 GW MON WELL 07/18/2018 9715303 P	606 GW MON WELL 02/27/2018 9483443 P	606 GW MON WELL 06/07/2018 9651311 P	606 GW MON WELL 07/17/2018 9715295 P	606 GW MON WELL 11/28/2018 9917507 P	607 GW MON WELL 02/27/2018 9483444 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.03 252 13.2 14.6	7.6 1040 12.2 0.44	7.15 195 13.2 0.35	7.79 82 14.1 3.07	7.72 148 9.6 0.47	7.24 1370 11.9 0.49
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.6 ND@0.5 ND@0.5 ND@0.5 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.06 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	2.2 ND@0.5 ND@0.5 23 2.2 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 1.1

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		607 GW MON WELL 06/07/2018 9651312 P	607 GW MON WELL 07/17/2018 9715296 P	607 GW MON WELL 11/28/2018 9917508 P	608 GW MON WELL 02/28/2018 9485191 P	608 GW MON WELL 07/18/2018 9714836 P	609 GW MON WELL 02/27/2018 9485199 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.87 1412 13.2 0.46	6.97 1350 13.1 9.82	6.8 232 10.8 0.65	7.57 2000 5.5 0.72	6.57 1863 16.3 0.83	7.52 523 13.5 0.79
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1.3 ND@0.5 ND@0.5 21 1.7 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	1.3 ND@0.5 ND@0.5 23 1.9 0.4 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3.5 0.4 J ND@0.5 50 3.4 0.8 ND@0.5 0.1 J ND@0.5 2.8 ND@0.5 ND@0.5 ND@0.5	0.8 ND@0.5 ND@0.5 5.3 1.3 0.4 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	1.5 0.2 J ND@0.5 7.8 2.8 0.5 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3300 450 ND@25 2200 110 54 ND@25 ND@25 ND@25 120 ND@25 ND@25 ND@25 ND@25 ND@25
TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L	ND@0.5 1.1	ND@0.5 1.5	ND@0.5 2.6	ND@0.5 1	ND@0.5 3	ND@25 11 J

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		609 GW MON WELL 07/17/2018 9715272 P	610 GW MON WELL 02/27/2018 9483448 P	610 GW MON WELL 07/17/2018 9715265 P	610 GW MON WELL 12/06/2018 9930027 P	611 GW MON WELL 02/27/2018 9483449	611 GW MON WELL 07/17/2018 9715266
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	8.41 135 15.3 3.77	6.51 25560 13.3 0.92	7.3 794 17.6 13.2	5.51 17734 13.6 1.18	7.04 35390 10.6 NA	6.58 25513 20.8 130
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	3900 390 ND@25 1900 100 43 ND@25 ND@25 ND@25 ND@25 ND@25 ND@25 ND@25 ND@25 ND@25 110 ND@25 14 J	180 4.3 1.7 J 46 75 ND@2.5 ND@2.5 0.5 J 43 ND@2.5 1.7 J 18 240 ND@2.5 ND@2.5	190 5.8 1.9 J 54 97 ND@2.5 0.6 J ND@2.5 0.6 J 54 ND@2.5 2.9 19 280 ND@2.5 ND@2.5	160 5.4 1.9 J 39 63 0.3 J 0.5 J ND@2.5 0.5 J 36 ND@2.5 1.4 J 19 220 ND@2.5 ND@2.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		611 GW MON WELL 12/06/2018 9930028	612 GW MON WELL 02/27/2018 9483450 P	612 GW MON WELL 07/17/2018 9715267 P	612 GW MON WELL 12/06/2018 9930025 P	613 GW MON WELL 02/27/2018 9483451 P	613 GW MON WELL 07/17/2018 9715268 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	5.99 29694 13.9 4.64	6.55 10110 13.9 1.71	7.15 914 15.8 0.97	6.2 3477 11.6 1.27	5.65 11420 14.4 0.97	5.21 10020 15.1 0.71
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC)	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 0.6 ND@0.5 ND@0.5 ND@0.5	220 4.3 J 1.6 J 93 83 ND@5 1.9 J	230 5.5 2 J 100 100 ND@5 2.1 J	240 6.9 2 J 99 99 1.3 J 2 J	150 2.8 1 J 51 52 ND@2.5 1 J	160 3 1.2 J 58 60 ND@2.5 1.1 J
CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L	ND@0.5 ND@0.5 ND@0.5 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5	1.9 J 1.1 J ND@5 110 ND@5 7.2 3.1 J 550 ND@5 4.8 J	2.1 J 1.3 J ND@5 130 ND@5 9.3 3 J 660 ND@5 7.3	2 J 2 J ND@5.0 110 ND@5.0 8.4 2.8 J 570 ND@5.0 8.1	0.7 J ND@2.5 59 ND@2.5 2.4 J 9 340 ND@2.5 3.4	1.1 J 1 J ND@2.5 70 ND@2.5 2.3 J 9.4 380 ND@2.5 5.2

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		613 GW MON WELL 12/06/2018 9930026 P	614 GW MON WELL 12/04/2018 9928611 P	615 GW MON WELL 07/18/2018 9714835 P	616 GW MON WELL 02/28/2018 9485210 P	616 GW MON WELL 07/18/2018 9715310 P	617 GW MON WELL 02/28/2018 9485200 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	4.96 12114 12.4 1.04	7.14 107 11.7 1.04	6.89 1858 16.7 0.63	6.35 1010 9.4 1.09	6.66 568 18.8 4.43	6.85 629 8.1 0.97
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	140 2.8 J 1.3 J 47 46 ND@5.0 1.2 J ND@5.0 ND@5.0 53 ND@5.0 1.5 J 10 330 ND@5.0 4.9 J	ND@0.5 ND@0.5 ND@0.5 0.6 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		617 GW MON WELL 07/17/2018 9715273 P	618 GW MON WELL 02/28/2018 9485201 P	618 GW MON WELL 07/17/2018 9715274 P	619 GW MON WELL 12/04/2018 9928702 P	620 GW MON WELL 12/04/2018 9928699	621 GW MON WELL 06/07/2018 9649967 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.62 644 18.8 0.79	6.65 522 6 0.52	7.44 474 17.6 2.22	6.94 2028 12.2 4.15	6.6 449 13.2 120	6.42 3045 11.9 0.42
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	340 29 ND@5.0 420 83 4 J 2.3 J ND@5.0 ND@5.0 ND@5.0 ND@5.0 ND@5.0 ND@5.0 ND@5.0 ND@5.0 1.6 J	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	51 3.1 ND@0.5 80 7.9 1.9 0.2 J 0.1 J 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		621 GW MON WELL 12/04/2018 9928694 P	622 GW MON WELL 06/07/2018 9649968 P	622 GW MON WELL 12/04/2018 9928695 P	623 GW MON WELL 11/28/2018 9917511 P	624 GW MON WELL 11/28/2018 9917512 P	625 GW MON WELL 02/28/2018 9485195 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.04 662 13.4 0.98	6.7 2161 11.6 0.15	6.11 1917 13.6 1.45	6.21 2043 9.2 0.62	6.02 1909 10.3 0.61	6.27 753 6.8 0.61
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	51 3.1 ND@0.5 70 7.4 1.7 0.2 J 0.1 J 0.1 J 0.06 J ND@0.5 ND@0.5 ND@0.5 ND@0.5	16 0.3 J ND@0.5 60 3.4 2 0.1 J 1.1 ND@0.5 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.3 J	12 0.2 J ND@0.5 58 2.7 2 0.1 J 2 ND@0.5 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.8 ND@0.5 0.8	38 0.8 ND@0.5 36 2.4 0.7 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	36 1 ND@0.5 37 3.6 0.6 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 0.6 ND@0.5 2.5 ND@0.5 7.1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		625 GW MON WELL 06/04/2018 9649944 P	625 GW MON WELL 07/18/2018 9715315 P	625 GW MON WELL 12/03/2018 9928683 P	626 GW MON WELL 06/04/2018 9649945 P	626 GW MON WELL 12/03/2018 9928684 P	627 GW MON WELL 06/07/2018 9651314 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.24 695 9.8 0.4	6.84 651 11.4 1.28	7.02 278 10.1 0.97	7.27 590 9.5 0.33	7.1 373 10.8 1.36	6.56 250 9.3 0.24
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	ND@0.5 1.8 ND@0.5 2.7 0.1 J 12 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 3.8 ND@0.5 3.2 0.3 J 15 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 0.3 J ND@0.5 2.8 ND@0.5 12 0.05 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.3 J 1.9 ND@0.5 0.1 J ND@0.5 0.8 ND@0.5 ND@0.5 ND@0.5 1 4.1 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		627 GW MON WELL 11/27/2018 9917434 P	628 GW MON WELL 02/14/2018 9463780 P	628 GW MON WELL 11/27/2018 9917435 P	629 GW MON WELL 12/04/2018 9928706 P	630 GW MON WELL 12/04/2018 9928607 P	631 GW MON WELL 06/07/2018 9651325 P
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	6.94 296 10.7 0.48	7.71 690 9.4 0.81	6.96 761 10.8 1.27	7.63 461 11.3 2.22	7.67 772 6.4 3.42	7.09 371 13 0.19
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.3 J 1.9 ND@0.5 0.2 J 0.08 J 1.4 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 0.5 J 0.1 J 0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	7 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	0.2 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D. Sample Comment Codes		631 GW MON WELL 11/27/2018 9917449 P	632 GW MON WELL 06/07/2018 9651326 P	632 GW MON WELL 11/27/2018 9917452 P	700 GW MON WELL 06/08/2018 9651334	700 GW MON WELL 12/05/2018 9930019	701 GW MON WELL 06/08/2018 9651333
Parameter	Units						
Indicator Parameters							
PH SPECIFIC CONDUCTANCE TEMPERATURE TURBIDITY	SU umhos/cm C NTU	7.01 431 9.8 1.28	6.29 2811 14.4 0.53	6.22 1821 9.7 1.07	6.82 2552 12.7 7.2	6.73 2641 12 29.8	6.62 2665 13.8 770
Volatile Organics							
1,1,1-TRICHLOROETHANE 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) CIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.06 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	3.4 ND@0.5 ND@0.5 0.1 J 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	13 0.3 J ND@0.5 0.5 J 0.3 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	260 29 ND@5 420 37 8.5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5 ND@5	310 37 ND@5.0 480 42 7.9 ND@5.0 0.8 J ND@5.0 64 ND@5.0 ND@5.0 ND@5.0	470 47 ND@10 770 72 15 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 130
TRICHLOROFLUOROMETHANE (FREON 11) VINYL CHLORIDE	ug/L ug/L	ND@0.5 ND@0.5	ND@0.5 ND@0.5	ND@0.5 ND@0.5	ND@5 7.2	ND@5.0 9.9	ND@10 12

Sample Date Laboratory Sample I.D. Sample Comment Codes		GW MON WELL 12/05/2018 9930018	GW MON WELL 07/16/2018 9715256 P	GW MON WELL 12/04/2018 9928703 P	GW MON WELL 12/04/2018 9928701 P
Parameter U	Units				
Indicator Parameters					
SPECIFIC CONDUCTANCE u TEMPERATURE C	SU umhos/cm C NTU	6.57 2825 11.4 172	6.66 798 20.5 0.57	7.9 1765 9.5 2.84	7.03 715 11.1 3.87
Volatile Organics					
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE 1,1,2-TRICHLOROETHANE 1,1-DICHLOROETHANE 1,1-DICHLOROETHENE 1,2-DICHLORO-1,2,2-TRIFLUOROETHANE 1,2-DICHLOROETHANE (EDC) CHLOROETHANE CHLOROFORM (TRICHLOROMETHANE) UICLIS-1,2-DICHLOROETHENE DICHLORODIFLUOROMETHANE (FREON 12) METHYLENE CHLORIDE (DICHLOROMETHANE) TETRACHLOROETHENE TRICHLOROETHENE TRICHLOROFLUOROMETHANE (FREON 11)	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	700 83 ND@10 980 86 17 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 ND@10 150 ND@10	ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5	38 9.1 ND@0.5 120 8.3 2.5 0.2 J 0.4 J 0.1 J 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 0.2 J ND@0.5 0.2 J	9.7 0.3 J ND@0.5 6.6 0.3 J 0.1 J ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5 ND@0.5

January 1, 2018 - December 31, 2018

Reporting Conventions

NA Not Analyzed

ND@X Not Detected at Detection Limit X

Code Explanation

- The value is estimated. In most cases, the result either
 - (1) is greater than the method detection limit (MDL) and less than the limit of quantitation (LOQ), or
 - (2) exceeds the upper limit of the calibration range of the analytical instrument.

APPENDIX G

Statistical Summary of Groundwater Chemistry Data

1993 - 2018

						Con	centrat	ions in i	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
101	COUNT	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
101	MAX	ND	7.9	1.1	0.1	ND	140	65	0.6	1.5	0.8	ND	14	ND	0.06	ND	ND
101	MEDIAN	ND	ND	ND	ND	ND	0.67	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
101	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
100	COLINIT	60	60	60					60			60		CO			
106	COUNT	69	69	69 ND	69 ND	69	69 ND	69 ND	69 ND	69 ND	69 ND	69 ND	69	69 ND	69 ND	69 ND	69 ND
106	MAX	0.41	0.55 ND	ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND
106 106	MEDIAN MIN	ND ND	ND	ND ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
100	IVIIIN	ND	ND	ND	ND	ND	ND	טוו	ND	NU	ND	ND	ND	NU	NU	ND	טוו
110	COUNT	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
110	MAX	ND	ND	ND	ND	ND	0.1	ND	0.18	ND	ND	ND	ND	ND	ND	ND	ND
110	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
110	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
110	171117	IVE	IVE	IVD	IND	IVD	110	IVD	140	IVD	IND	IVE	140	IVD	IVE	IVD	
120	COUNT	56	56	56	56	56	56	56	56	56	55	56	56	56	56	56	56
120	MAX	75	4.9	12	ND	ND	3.3	0.15	ND	ND	ND	ND	ND	ND	ND	0.2	ND
120	MEDIAN	14.9	1.015	0.4	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
120	MIN	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
124	COUNT	53	53	53	53	53	53	53	53	53	52	53	53	53	53	53	53
124	MAX	16	8	4	ND	ND	1.1	12	ND	ND	ND	19	ND	ND	ND	ND	ND
124	MEDIAN	0.34	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
124	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
125	COUNT	68	68	68	68	68	68	68	68	67	67	68	68	68	68	68	68
125	MAX	4100	490	650	0.1	19	2600	290	3.7	50	2.3	25	ND	ND	ND	2.9	ND
125	MEDIAN	233	99.75	66.05	ND	0.2	245	50.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
125	MIN	0.5	0.7	ND	ND	ND	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
40-																	
127	COUNT	52	52	52	52	52	52	52	52	52	52	52	52	52 ND	52 ND	52	52
127 127	MAX MEDIAN	2000 67.5	300 3.95	240 5.5	0.1	2.6	2015	141.6	18	4.3	ND	230	2.3	ND	ND	0.71	ND
127	MIN	67.5 ND	3.95 ND	ND	ND ND	ND ND	107 28.8	ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND
14/	IVIIIN	אט	טוו	טויו	אט	טויו	20.0	אט	טויו	טווו	אט	טאו	טויו	אט	טויו	טויו	טאו
128	COUNT	42	42	42	42	42	42	42	42	41	40	42	42	42	42	42	42
128	MAX	30822	11199	6903	ND	40	620	22204	564	1895	283	19000	3.3	ND	ND	160	200
128	MEDIAN	14295	4823.5	2990.5	ND	ND	ND	10814	ND	388	ND	ND	ND	ND	ND	ND	ND
128	MIN	180	45	74	ND	ND	ND	88	ND	ND	ND	ND	ND	ND	ND	ND	ND
	•		.0	- '			.,_							.,_			
129	COUNT	53	53	53	53	53	53	53	53	53	52	53	53	53	53	53	53
129	MAX	18	26	8	1	ND	25	0.32	0.2	ND	ND	0.37	ND	ND	ND	ND	0.21
129	MEDIAN	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
129	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

		Concentrations in micrograms per liter (ug/L)															
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
132	COUNT	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
132	MAX	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND
132	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
132	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
133	COUNT	69	69	69	69	69	69	69	69	68	67	69	69	69	69	69	69
133	MAX	1106	350	56	0.4	ND	8.68	0.2	0.2	41	2.62	5.3	0.2	ND	ND	0.1	0.5
133	MEDIAN	179	96	14.5	ND	ND	ND	ND	ND	3.15	ND	ND	ND	ND	ND	ND	ND
133	MIN	49	26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
133	.,,,,,,	.5		,,,,	.,5	.,,5	.,5	.,,,	.,5	.,,,	.,,,		.,5	.,,,	.,,5	.,5	.,5
134	COUNT	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
134	MAX	0.2	0.2	ND	ND	ND	0.3	ND	ND	1.9	ND	ND	0.58	0.2	ND	ND	ND
134	MEDIAN	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
134	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
146	COUNT	65	65	65	65	65	65	65	65	65	64	65	65	65	65	65	65
146	MAX	14	5.3	2.22	0.6	ND	27	1.6	ND	1.9	2.4	0.34	ND	0.43	ND	ND	ND
146	MEDIAN	5	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
146	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4.40	COLINIT	F.4	F.4	F.4	- A	- 1	F.4	F.4	F.4	- A		- A	5 4	- T 4	F 4	F.4	F.4
148 148	COUNT MAX	54 980	54 8.9	54	54 ND	54 ND	54 4.52	54 0.9	54 ND	54 7	53 ND	54 ND	54 0.2	54 ND	54 ND	54 1.4	54 0.3
148	MEDIAN	271.5	0.7	190 15	ND	ND	0.895	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
148	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
140	IVIIIV	ND	ND	ND	ND	ND	ND	IVD	IVD	ND	ND	ND	ND	ND	ND	IVD	ND
149	COUNT	70	70	70	70	70	70	70	70	69	68	70	70	70	70	70	70
149	MAX	146	70	24	0.2	ND	353	85	0.4	ND	ND	0.59	ND	ND	ND	ND	0.2
149	MEDIAN	13.4	22.7	5.75	ND	ND	30.5	22	ND	ND	ND	ND	ND	ND	ND	ND	ND
149	MIN	2.05	6.6	ND	ND	ND	8.5	6.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
157	COUNT	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49
157	MAX	1.6	0.7	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
157	MEDIAN	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
157	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
158	COUNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
158	MAX	1.4	ND	ND	ND	ND	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
158	MEDIAN	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
158	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
160	COUNT	69	69	69	69	69	69	69	69	68	67	69	69	69	69	69	69
160	MAX	170	17.8	42.1	ND	1.2	540	59	0.1	8.8	12	2.1	0.58	ND	ND	ND	0.2
160	MEDIAN	53	1.2	12	ND	ND	180	15	ND	ND	ND	ND	ND	ND	ND	ND	ND
160	MIN	0.34	ND	ND	ND	ND	12.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

		Concentrations in micrograms per liter (ug/L)															
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
162	COUNT	69	69	69	69	69	69	69	69	69	67	69	69	69	69	69	69
162	MAX	500	33	200	0.2	15.7	1790	180	1	2.7	0.09	7.2	1	ND	ND	0.1	0.4
162	MEDIAN	85	0.7	20	ND	ND	296	25.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
162	MIN	ND	ND	ND	ND	ND	38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
163	COUNT	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
163	MAX	0.8	ND	0.2	ND	ND	5.3	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
163	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
163	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
165	COUNT	64	64	64	64	64	64	64	64	63	63	64	64	64	64	64	64
165	MAX	122	25	31.4	0.3	0.4	370	100	2.6	3.96	0.2	3.8	0.2	0.51	ND	ND	0.2
165	MEDIAN	47	1.64	10.5	ND	ND	152.5	12	ND	ND	ND	ND	ND	ND	ND	ND	ND
165	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
166	COUNT	54	54	54	54	54	54	54	54	53	52	54	54	54	54	54	54
166	MAX	1.2	2.1	0.3	ND	ND	14.8	9.4	1.2	2.3	3.57	ND	ND	0.2	ND	ND	1.19
166	MEDIAN	0.475	0.945	ND	ND	ND	4.165	1.7	ND	0.68	0.595	ND	ND	ND	ND	ND	ND
166	MIN	ND	ND	ND	ND	ND	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
467	COLINIT	FC	F.C	F.C.	5.0	5.0	F.C	5.0	5.0		F.4	F.C	F.C	F.C.	F.C.	5.0	
167 167	COUNT MAX	56 1.5	56 ND	56 ND	56 ND	56 ND	56 17	56 0.08	56 ND	55 ND	54 ND	56 ND	56 ND	56 0.33	56 ND	56 ND	56 ND
167	MEDIAN	ND	ND	ND	ND	ND	5.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
167	MIN	ND	ND	ND	ND	ND	3.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
107	IVIIIV	ND	ND	ND	ND	ND	5.0	ND	ND	ND	IND	ND	IND	ND	ND	ND	IND
178	COUNT	68	68	68	68	68	68	68	68	68	67	68	68	68	68	68	68
178	MAX	120	20	19	ND	0.6	340	18	ND	1.1	0.2	1.2	0.4	ND	ND	ND	0.07
178	MEDIAN	45.05	13	1.85	ND	ND	148	6.95	ND	ND	ND	ND	ND	ND	ND	ND	ND
178	MIN	23	ND	ND	ND	ND	68	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
179	COUNT	84	84	84	84	84	84	84	84	84	83	84	84	84	84	84	84
179	MAX	58.6	12	10	ND	0.7	440	560	5.9	140	27	ND	0.3	5.5	1	ND	0.2
179	MEDIAN	20.65	1.43	4.845	ND	ND	85.65	9.95	ND	3.21	ND	ND	ND	ND	ND	ND	ND
179	MIN	8	ND	ND	ND	ND	11	1.99	ND	ND	ND	ND	ND	ND	ND	ND	ND
101	COUNT	25	25	35	35	35	35	35	35	35	34	25	25	25	35	25	25
181 181	MAX	35 22	35 3.8	2	0.39	ND	1.21	0.32	ND	0.41	0.66	35 ND	35 ND	35 ND	ND	35 ND	35 ND
181	MEDIAN	7	0.19	ND	ND	ND	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
181	MIN	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	.,,,,,		.,5														
183	COUNT	61	61	61	61	61	61	61	61	61	60	61	61	61	61	61	61
183	MAX	25	2.5	0.8	ND	0.1	710	77	0.3	0.3	ND	0.5	2.39	ND	ND	ND	ND
183	MEDIAN	10	ND	ND	ND	ND	260	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
183	MIN	ND	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
185	COUNT	77	77	77	77	77	77	77	77	77	76	77	77	77	77	77	77
185	MAX	8.8	3.5	0.81	ND	ND	180	35.1	0.1	6.9	2.1	ND	2.2	0.7	ND	ND	0.89
185	MEDIAN	2.9	0.8	ND	ND	ND	52.9	2.2	ND	2.57	0.3	ND	ND	ND	ND	ND	ND
185	MIN	ND	ND	ND	ND	ND	20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
186	COUNT	68	68	68	68	68	68	68	68	68	67	68	68	68	68	68	68
186	MAX	19	77	7.3	ND	0.3	351	108	0.51	128	222	1	6.2	4.44	ND	ND	0.45
186	MEDIAN	5.045	2.1	0.2	ND	ND	88	9.7	ND	15	1.4	ND	ND	ND	ND	ND	ND
186	MIN	ND	ND	ND	ND	ND	ND	3.6	ND	ND	ND	ND	ND	ND	ND	ND	ND
100	.,,,,,,	,,,,,	,,5	.,5	.,5	.,5	.,,,	3.3		.,5	.,5	.,,,		,,,,	.,,5	.,5	
194	COUNT	70	70	70	70	70	70	70	70	68	67	70	70	70	70	70	70
194	MAX	100	33	22	5.6	ND	0.3	0.41	0.2	0.98	0.2	0.3	ND	ND	ND	ND	ND
194	MEDIAN	23.3	20.4	2.715	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
194	MIN	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
306	COUNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
306	MAX	0.67	0.2	ND	ND	0.2	0.6	ND	ND	ND	ND	ND	ND	0.5	ND	ND	ND
306	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
306	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
200	COLINIT	60	CO	CO		CO	CO	CO	CO	C7	CC		CO	69	CO	69	
308 308	COUNT MAX	69 611	69 198	69 99	69 0.8	69 ND	69 4.43	69 1.3	69 0.1	67 8.2	66 1.5	69 0.5	69 0.2	ND	69 ND	ND	69 0.5
308	MEDIAN	315	84	8.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
308	MIN	45	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
					.,,	.,,	,,,,	.,,,	,,,,	1,12	,,,,	.,,_	,,,,	1,12			
309	COUNT	63	63	63	63	63	63	63	63	63	62	63	63	63	63	63	63
309	MAX	24	15	2.5	ND	ND	19	0.13	ND	0.65	ND	0.1	0.2	1.1	ND	ND	ND
309	MEDIAN	2.6	ND	ND	ND	ND	9.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
309	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
313	COUNT	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
313	MAX	15.5	2.9	0.93	ND	ND	51.6	ND	ND	0.33	ND	ND	0.5	ND	ND	ND	ND
313	MEDIAN	4.06	1.015	0.22	ND	ND	17.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
313	MIN	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
314	COUNT	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
314	MAX	0.77	1.1	0.5	ND	ND	0.06	1.9	ND	ND	ND	ND	ND	ND	ND	ND	0.07
314	MEDIAN	ND	ND	ND	ND	ND	ND	0.11	ND	ND	ND	ND	ND	ND	ND	ND	ND
314	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
316	COUNT	51	51	51	51	51	51	51	51	50	50	51	51	51	51	51	51
316	MAX	2.9	0.25	ND	ND	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
316	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
316	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in i	microg	rams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
317	COUNT	83	83	83	83	83	83	83	83	81	80	83	83	83	83	83	83
317	MAX	77.2	4.9	19	ND	0.3	244	28	ND	0.5	ND	0.61	0.1	ND	ND	ND	0.1
317	MEDIAN	22	0.33	4.1	ND	ND	79	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
317	MIN	1.3	ND	ND	ND	ND	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
240	COLINIT	100	100	100	100	100	100	100	100	105	104	100	100	100	100	100	100
318	COUNT	106	106	106	106	106	106	106 90	106	105	104	106	106	106	106	106	106
318	MAX	3.6	7 3.4	2 0.67	ND ND	ND ND	48	13.05	0.8	17 5	37 10.9	ND ND	0.92 ND	3.01 ND	15 ND	ND ND	0.22 ND
318 318	MEDIAN MIN	ND ND	0.32	ND	ND	ND	14.85	0.62	ND	0.7	ND	ND	ND	ND	ND	ND	ND
210	IVIIIN	ND	0.52	ND	ND	ND	1	0.02	ND	0.7	ND	ND	ND	ND	ND	ND	ND
319	COUNT	111	111	111	111	111	111	111	111	110	109	111	111	111	111	111	111
319	MAX	9.7	5.1	4.2	ND	ND	30	14	3.1	3.6	3.7	ND	0.27	0.36	2	ND	0.2
319	MEDIAN	ND	2.47	0.3	ND	ND	4.24	2.89	ND	1.2	1.34	ND	ND	ND	ND	ND	ND
319	MIN	ND	ND	ND	ND	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
321	COUNT	70	70	70	70	70	70	70	70	68	67	70	70	70	70	70	70
321	MAX	9	3.5	0.68	ND	ND	17	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
321	MEDIAN	2.705	1.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
321	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
322	COUNT	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111
322	MAX	ND	4.3	0.41	ND	0.18	0.92	13	1.05	9.7	18	ND	ND	2.6	4.5	ND	ND
322	MEDIAN	ND	1.8	ND	ND	ND	ND	2.6	ND	3.25	4.92	ND	ND	ND	ND	ND	ND
322	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
			100	100													
323	COUNT	103	103	103	103	103	103	103	103	103	102	103	103	103	103	103	103
323	MAX	0.2	5.3	1.1	ND	0.1	142	66	0.9	5.5	17.7		0.3	2.14	1	ND	0.21
323	MEDIAN MIN	ND ND	1.3 ND	ND ND	ND ND	ND ND	30 ND	1.76 ND	ND ND	1 ND	1.64 ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND
323	IVIIIV	ND	IND	ND	ND	שויו	IND	ND	שויו	ND	IND	שאו	שאו	IND	IND	שאו	ND
324	COUNT	72	72	72	72	72	72	72	72	71	71	72	72	72	72	72	72
324	MAX	8800	6919	1400	1.5	2.1	825	215	5.8	370	127	92	1	ND	ND	1.8	0.8
324	MEDIAN	418	205.5	120	ND	ND	500	45.25	ND	13.4	ND	ND	ND	ND	ND	ND	ND
324	MIN	150	79	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
325	COUNT	56	56	56	56	56	56	56	56	56	55	56	56	56	56	56	56
325	MAX	1100	162	330	1	16	1400	122	4.3	19.1	1.7	15	0.6	ND	ND	1.3	0.7
325	MEDIAN	180	69	74	ND	4.67	410	38	ND	3.6	ND	1.95	ND	ND	ND	ND	ND
325	MIN	85.9	41.3	26.7	ND	ND	250	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
351	COUNT	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
351	MAX	0.3	0.57	0.2	ND	ND	0.2	1.1	0.68	0.89	1.9	ND	ND	0.2	ND	ND	0.06
351	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
351	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in i	micro	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
352	COUNT	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
352	MAX	0.2	0.1	0.07	ND	ND	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
352	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
352	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
353	COUNT	36	36	36	36	36	36	36	36	36	35	36	36	36	36	36	36
353	MAX	31000	5900	8500	ND	ND	4683	349	15	147	ND	368	2.8	ND	ND	8.4	ND
353	MEDIAN		3026	2349	ND	ND	3368	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
353	MIN	ND	120	110	ND	ND	490	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
354	COUNT	28	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28
354	MAX	7300	190	2000	ND	50	2900	15.6	ND	3.7	ND	14	1	ND	ND	4.9	ND
354	MEDIAN	583.5	ND	76.4	ND	ND	121	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
354	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
355	COUNT	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
355	MAX	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
355	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
355	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
356	COUNT	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27
356	MAX	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
356	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
356	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
		.,,,	.,,,	.,,_	.,,,	.,,	.,,_	,,,,	,,,,,	1,12	,,,,	.,,,	,,,,		.,,,		
357	COUNT	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66	66
357	MAX	0.7	4.3	0.2	ND	ND	ND	ND	0.3	0.23	ND	0.29	ND	0.62	ND	ND	ND
357	MEDIAN	ND	0.195	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
357	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
358	COUNT		48	48	48	48	48	48	48	48	47	48	48	48	48	48	48
358	MAX		37	15	2	ND	35	3.36	1.1	2	3	0.27	0.2	0.33	2	ND	0.06
358	MEDIAN		17	5.55	ND	ND	10	0.975	0.05	0.225	0.9	ND	ND	ND	ND	ND	ND
358	MIN	5.9	6.3	0.87	ND	ND	1.56	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
361	COUNT	35	35	35	35	35	35	35	35	35	34	35	35	35	35	35	35
361	MAX		7.4	0.8	0.16	ND	4.1	1.3	ND	0.2	ND	0.13	0.1	ND	ND	ND	ND
361	MEDIAN		1.4	ND	ND	ND	0.85	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND
361	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
			.=	13													
362	COUNT	33	33	33	33	33	33	33	33	33	32	33	33	33	33	33	33
362	MAX		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.6	ND	ND	ND
362	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
362	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

	Ī					Con	centrat	ions in	micro	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
363	COUNT	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37
363	MAX	8.6	5	1	ND	ND	0.69	ND	ND	ND	ND	ND	ND	0.84	ND	ND	ND
363	MEDIAN	1.7	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
363	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
264	COLINIT	25	25	25	25	25	25	25	25	25	24	25	25	25	25	25	25
364	COUNT	35 ND	35 ND	35 ND	35	35	35	35	35	35	34	35 ND	35	35	35 ND	35	35
364 364	MAX	ND	ND ND	ND	ND ND	ND ND	ND ND	0.1 ND	ND ND	ND ND	ND ND	ND	ND ND	ND ND	ND	ND ND	ND ND
364	MEDIAN MIN	ND ND	ND	ND ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
304	IVIIIN	ND	ND	ND	ND	ND	NU	ND	ND	NU	NU	ND	ND	NU	NU	ND	ND
365	COUNT	39	39	39	39	39	39	39	39	39	38	39	39	39	39	39	39
365	MAX	ND	ND	ND	ND	ND	14	0.51	ND	ND	ND	ND	ND	ND	ND	ND	ND
365	MEDIAN	ND	ND	ND	ND	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
365	MIN	ND	ND	ND	ND	ND	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
303	IVIIIV	IVE	IVE	IVE	IVE	140	0.7	IVD	110	IVD	IVD	IVD	IVD	IVD	IVD	IVD	IVE
366	COUNT	36	36	36	36	36	36	36	36	34	33	36	36	36	36	36	36
366	MAX	180	39	37	ND	0.92	138	16	0.54	6.8	4	1.6	1	ND	0.38	ND	ND
366	MEDIAN	28.45	8.85	5.6	ND	ND	21.5	2.7	ND	0.29	0.92	ND	ND	ND	ND	ND	ND
366	MIN	ND	3.61	ND	ND	ND	5.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
367	COUNT	56	56	56	56	56	56	56	56	56	54	56	56	56	56	56	56
367	MAX	144	13	24	0.1	ND	12	5.8	1.4	4.4	1.4	1.46	0.7	2.5	ND	0.2	0.1
367	MEDIAN	80	4.88	9.75	ND	ND	3.35	ND	ND	2.365	ND	ND	ND	ND	ND	ND	ND
367	MIN	52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
368	COUNT	50	50	50	50	50	50	50	50	49	49	50	50	50	50	50	50
368	MAX	31	53	15	4.6	0.2	71	32.2	7.5	0.6	2.1	0.45	0.81	0.84	ND	ND	ND
368	MEDIAN	ND	11.5	0.815	ND	ND	1.9	8.25	1	ND	0.4	ND	ND	ND	ND	ND	ND
368	MIN	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
272	601111	63	62	62	63	63	63	62	62	63	63	62	62	62	62	63	63
373 373	COUNT MAX	62	62 3	62	62 ND	62 ND	62	62	62 ND	62	62 ND	62 ND	62 ND	62 ND	62 ND	62 ND	62 ND
373	MEDIAN	5.1	0.925	0.77 ND	ND ND	ND ND	0.9 ND	0.1 ND	ND ND	0.16 ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND
373	MIN	2.7	0.925 ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3/3	IVIIIV	2.1	שואו	ND	טויו	טויו	טאו	שויו	טאו	טווי	טאו	שויו	שויו	טווי	טווי	שויי	שויו
374	COUNT	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
374	MAX	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.7	ND	ND	ND
374	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
374	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
378	COUNT	98	98	98	98	98	98	98	98	97	96	98	98	98	98	98	98
378	MAX	989	1200	110	2.3	ND	150	120	36	95	30	1.4	1	0.62	25	0.1	0.7
378	MEDIAN	47.4	68.3	2.96	ND	ND	2.48	3.32	ND	1.06	ND	ND	ND	ND	ND	ND	ND
378	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in i	nicro	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
379	COUNT	38	38	38	38	38	38	38	38	38	37	38	38	38	38	38	38
379	MAX	117	32	1.8	ND	ND	0.3	2.97	1.1	2.8	2.8	ND	ND	ND	ND	ND	ND
379	MEDIAN	ND	0.025	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND
379	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
382	COUNT	33	33	33	33	33	33	33	33	33	32	33	33	33	33	33	33
382	MAX	0.7	ND	ND	ND	ND	0.3	ND	ND	ND	ND	ND	ND	3.4	ND	ND	ND
382	MEDIAN	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.78	ND	ND	ND
382	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
383	COUNT	65	65	65	65	65	65	65	65	65	64	65	65	65	65	65	65
383	MAX	15	4.4	3	0.4	ND	23	1.1	ND	0.53	0.2	0.22	ND	0.69	ND	ND	ND
383	MEDIAN	5.8	1.81	0.71	ND	ND	5.7	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
383	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
386	COUNT	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
386	MAX	87	29	19	ND	0.1	207	269	0.8	6.9	4.08	ND	0.1	ND	ND	ND	0.2
386	MEDIAN	31.5	16.5	7.1	ND	ND	124.5	35.05	ND	0.3	ND	ND	ND	ND	ND	ND	ND
386	MIN	14.9	6	ND	ND	ND	69.9	14	ND	ND	ND	ND	ND	ND	ND	ND	ND
387	COUNT	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
387	MAX	ND	ND	ND	ND	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
387	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
387	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
392	COUNT	69	69	69	69	69	69	69	69	69	68	69	69	69	69	69	69
392	MAX	138	48	47	1.9	ND	280	25	1.7	4.5	3.2	1.2	0.6	ND	ND	0.4	ND
392	MEDIAN	14	5.7	2.3	ND	ND	30	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND
392	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
393	COUNT	103	103	103	103	103	103	103	103	103	102	103	103	103	103	103	103
393	MAX	1857	1400	120	2.7	ND	230	150	23	130	26	38.9	ND	0.2	ND	ND	0.6
393	MEDIAN	463	750	52.6	ND	ND	71.2	54 ND	1.96	45.3	4.4 ND	ND	ND	ND	ND	ND	ND
393	MIN	ND	1.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
394	COUNT	68	68	68	68	68	68	68	68	68	66	68	68	68	68	68	68
394	MAX	13	6.5	1.3	ND	ND	2.3	0.33	ND	0.31	ND	ND	ND	0.45	ND	ND	ND
394	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
394	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
395	COUNT	38	38	38	38	38	38	38	38	38	37	38	38	38	38	38	38
395	MAX	9514	10002	1665	2.7	ND	1307	507	20	314	42	683	ND	ND	ND	ND	ND
395	MEDIAN	1835.5	1412	110	ND	ND	190	120	ND	126.5	ND	ND	ND	ND	ND	ND	ND
395	MIN	780	770	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in i	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
397	COUNT	28	28	28	28	28	28	28	28	28	27	28	28	28	28	28	28
397	MAX	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
397	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
397	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
200	COUNT	67	67	67	67	67	67	67	67	67	66	67	67	67	67	67	67
398 398	MAX	73	13	12	0.5	ND	17.6	2.2	0.6	1.6	0.99	0.55	0.14	0.12	ND	ND	0.06
398	MEDIAN	12.8	7.2	3.9	ND	ND	3.9	0.45	ND	0.3	0.465	ND	ND	ND	ND	ND	ND
398	MIN	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
330	.,,,,,,	3.3	.,,5	.,5		.,5	.,,,	.,,,	.,5	.,5	.,5	.,,,	.,5	.,,,			.,5
399	COUNT	105	105	105	105	105	105	105	105	105	104	105	105	105	105	105	105
399	MAX	35	12	11	1.2	ND	14	1.1	0.3	1	1	0.51	ND	ND	ND	ND	0.2
399	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
399	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
404	COUNT	112	112	112	112	112	112	112	112	110	109	112	112	112	112	112	112
404	MIN	ND	ND	ND	ND	ND	98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
404	MAX	24	13	3.5	1.5	0.2	440	35	0.7	96	24	ND	41	16.5	13.6	ND	0.1
404	MEDIAN	7.3	4.84	ND	ND	ND	220.5	20.4	ND	44.5	8.9	ND	1.6	ND	ND	ND	ND
					440												445
405	COUNT	113	113	113	113	113	113	113	113	113	111	113	113	113	113	113	113
405 405	MIN	ND	ND 8.2	ND 24	ND ND	ND 0.8	56 395	ND 50	ND 0.3	ND 220	ND 14	ND 87	ND 17	ND 9.8	ND ND	ND ND	ND 0.1
405	MAX MEDIAN	50 21	4.1	3.2	ND	ND	124	23	ND	71	3.3	ND	0.1	9.8 ND	ND	ND	ND
403	IVIEDIAIN	21	4.1	3.2	ND	ND	124	23	ND	/1	3.3	IND	0.1	IND	ND	ND	IND
413	COUNT	115	115	115	115	115	115	115	115	113	112	115	115	115	115	115	115
413	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
413	MAX	1385	1521	69.6	11	1.7	220	101	5.1	86.7	22	22	9285	55	ND	19	2.2
413	MEDIAN	62	80	10	ND	ND	25	4	ND	2.4	0.3	ND	0.7	ND	ND	ND	ND
418	COUNT	112	112	112	112	112	112	112	112	111	110	112	112	112	112	112	112
418	MIN	4.57	1.98	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
418	MAX	12724	14000	520	11	6.5	810	580	38	911	330	28	2394	1.1	36	2.3	2.3
418	MEDIAN	1505	1250	110	ND	ND	270	81.55	ND	67	6.2	ND	ND	ND	ND	ND	ND
44.5	60::::=	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
415	COUNT	39 800	39 800	39 640	39 ND	39 9.7	39 700	39 1800	39 84	39 60	39	39	39	39	39	39	39
415 415	MIN MAX	4300	4200	2500	ИD 1	65	2700	10000	510	490	ND 42	ND 50	ND 1.5	ND ND	ND ND	ND 32	ND 4.7
415	MEDIAN	2100	1500	1300	ND	31	1500	3500	190	180	ND	ND	ND	ND	ND	6.5	ND
413	MILDIAIN	2100	1300	1300	140	51	1300	3300	130	100	140	140	.40	140	140	0.5	140
416	COUNT	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
416	MIN	48	100	5.1	ND	ND	46	16	0.8	4.6	1.6	ND	ND	ND	ND	ND	ND
416	MAX	600	1200	110	4.2	1.4	280	97	11	68	27	ND	0.2	ND	ND	0.3	0.7
416	MEDIAN	400	850	69	1.6	ND	130	78	7.9	41	12	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
521	COUNT	80	80	80	80	80	80	80	80	78	77	80	80	80	80	80	80
521	MAX	160	740	36	51	ND	7.4	42	30	16	13	0.3	2.6	0.33	ND	ND	ND
521	MEDIAN	13.25	43.1	2.23	0.68	ND	ND	1.2	0.98	ND	ND	ND	ND	ND	ND	ND	ND
521	MIN	ND	0.18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
522	COUNT	111	111	111	111	111	111	111	111	111	110	111	111	111	111	111	111
522	MAX	381	630	48	1.6	ND	33	55	18	36	12	0.4	ND	0.3	111	ND	ND
522	MEDIAN	59.4	167	9.7	0.24	ND	1.94	7.8	0.84	2.87	0.105	ND	ND	ND	ND	ND	ND
522	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
								.,_									
524	COUNT	64	64	64	64	64	64	64	64	64	63	64	64	64	64	64	64
524	MAX	ND	0.2	ND	ND	ND	0.2	ND	ND	0.58	ND	ND	ND	ND	ND	ND	ND
524	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
524	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
529	COUNT	99	99	99	99	99	99	99	99	99	98	99	99	99	99	99	99
529	MAX	1.06	4.9	0.36	0.43	ND	0.2	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND
529	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
529	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
532	COUNT	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
532	MAX	15	16.7	3.56	0.12	ND	8	1.04	0.3	0.46	0.96	0.23	ND	ND	ND	ND	ND
532	MEDIAN	1.15	0.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
532	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
534	COUNT	100	100	100	100	100	100	100	100	97	97	100	100	100	100	100	100
534	MAX	1.2	1.6	0.09	0.2	ND	2	1	0.4	ND	ND	0.37	ND	0.85	ND	ND	ND
534	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
534	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
540	COUNT	47	47 ND	47	47 ND	47	47	47	47	47 ND	47 ND	47 ND	47	47 ND	47 ND	47	47
540	MAX	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
540 540	MEDIAN MIN	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND	ND ND
340	IVIIIV	מא	טוו	טוו	טויו	טויו	טווו	טוו	טויו	טווו	אט	טויו	טויו	טווו	טויו	טויו	טאו
541	COUNT	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
541	MAX	0.1	ND	ND	ND	ND	2.7	0.3	0.1	ND	ND	ND	ND	ND	ND	ND	ND
541	MEDIAN	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
541	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
542	COUNT	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
542	MAX	ND	ND	ND	ND	ND	0.2	ND	1.2	1.8	ND	ND	ND	ND	ND	ND	ND
542	MEDIAN	ND	ND	ND	ND	ND	ND	ND	0.47	ND	ND	ND	ND	ND	ND	ND	ND
542	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
543	COUNT	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59	59
543	MAX	1.8	1.36	1.8	ND	ND	8.5	17.4	ND	5.9	10	ND	0.94	1.18	1.8	ND	ND
543	MEDIAN	ND	0.2	ND	ND	ND	ND	3.69	ND	1.42	2.44	ND	ND	ND	ND	ND	ND
543	MIN	ND	ND	ND	ND	ND	ND	0.4	ND	0.3	ND	ND	ND	ND	ND	ND	ND
601	COUNT	66	66	66	66	66	66	66	66	62	62	66	66	66	66	66	66
601	MAX	2.1	6.3	0.42	0.54	ND	0.86	0.15	ND	ND	0.57	0.4	ND	0.94	ND	ND	ND
601	MEDIAN	ND	1.115	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
601	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
602	COUNT	69	69	69	69	69	69	69	69	63	63	69	69	69	69	69	69
602	MAX	41	9.5	7.8	0.16	ND	90	6.1	ND	2.6	0.67	1.3	0.45	0.67	ND	ND	ND
602	MEDIAN	15	4.2	2.2	ND	ND	33	3.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
602	MIN	0.2	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
603	COUNT	64	64	64	64	64	64	64	64	61	61	64	64	64	64	64	64
603	MAX	3.9	3.8	0.17	ND	ND	2.7	0.32	ND	ND	ND	ND	ND	ND	ND	ND	ND
603	MEDIAN	0.445	0.6	ND	ND	ND	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
603	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
604	COUNT	54	54	54	54	54	54	54	54	51	51	54	54	54	54	54	54
604	MAX	ND	ND	ND	ND	ND	0.2	ND	ND	ND	ND	0.11	0.14	ND	ND	ND	ND
604	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
604	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
605	COUNT	46	46	46	46	46	46	46	46	43	43	46	46	46	46	46	46
605	MAX	0.1	ND	ND	ND	ND	1.8	0.1	ND	ND	ND	ND	ND	0.63	ND	ND	ND
605	MEDIAN	ND	ND	ND	ND	ND	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
605	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
505	0011117	110	440	440	110	110	440	110	110	105	405	440	440	440	440	110	440
606	COUNT MAX	113	113	113	113 0.35	113	113 35	9.5	3.4	105	105	113	113	113	113	113	113
606 606	MEDIAN	50 13	23 1.5	22	ND	ND ND	2.8	0.62	0.2	2.2 ND	1.1 ND	0.48 ND	0.3 ND	ND ND	ND ND	0.2 ND	ND ND
606	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
000	171117	IVE	IVE	IVE	IVE	IVD	IVD	110	IVD	110	110	110	145	IVE	IVE	IVD	IVE
607	COUNT	111	111	111	111	111	111	111	111	106	106	111	111	111	111	111	111
607	MAX	71	50	21	0.2	ND	46	9.9	2.6	2.3	1	0.48	0.3	ND	ND	1.3	ND
607	MEDIAN	8.6	2.61	3.4	ND	ND	8	0.6	0.4	0.2	ND	ND	ND	ND	ND	ND	ND
607	MIN	ND	ND	0.4	ND	ND	1.24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
608	COUNT	70	70	70	70	70	70	70	70	64	64	70	70	70	70	70	70
608	MAX	220	21	44	2.4	ND	140	7.32	6.6	3.2	1.46	0.51	0.2	ND	ND	ND	ND
608	MEDIAN	12.5	8.4	4.89	ND	ND	24.65	1.65	0.24	0.3	0.5	ND	ND	ND	ND	ND	ND
608	MIN	0.6	2	1.3	ND	ND	4.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in ı	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
609	COUNT	49	49	49	49	49	49	49	49	43	43	49	49	49	49	49	49
609	MAX	25949	4664	319	2.3	28	480	356	16	1144	150	ND	ND	166	ND	0.65	16
609	MEDIAN	6700	2736	110	ND	ND	140	95	ND	470	ND	ND	ND	ND	ND	ND	ND
609	MIN	226	186	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
C10	COLINIT	C1	C1	C1	C1	C1	C1	C1	C1	F2		C1	C1			C1	
610	COUNT	61	61	61	61	61	61	61	61	53	53	61	61	59 ND	59	61	61
610	MAX MEDIAN	1200	182 65	250 99	0.3 ND	68	1300 340	139.6 48	0.7 ND	29 7.8	2 ND	16 2.4	2.2 ND	ND ND	ND ND	9.3 ND	1.5 ND
610 610	MIN	211 38	9.7	19	ND	21 ND	54	ND	ND	7.8 ND	ND	ND	ND	ND	ND	ND	ND
010	IVIIIN	36	9.7	19	ND	ND	54	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
611	COUNT	55	55	55	55	55	55	55	55	52	52	55	55	55	55	55	55
611	MAX	9.9	23	1.3	0.12	0.26	6.5	5.1	0.4	ND	ND	0.14	ND	0.45	ND	ND	ND
611	MEDIAN	ND	2.3	ND	ND	ND	0.6	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND
611	MIN	ND	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
612	COUNT	70	70	70	70	70	70	70	70	62	62	70	70	70	70	70	70
612	MAX	2900	350	710	150	4.4	2700	310	120	33	2.4	86	2.1	ND	ND	4	3.3
612	MEDIAN	532.5	150	153.5	ND	ND	874	140	3.95	ND	ND	9.95	ND	ND	ND	ND	ND
612	MIN	4.66	ND	1.5	ND	ND	9.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
613	COUNT	73	73	73	73	73	73	73	73	65	65	73	73	73	73	73	73
613	MAX	2200	250	480	18	25	2200	220	29	39	2	44	1.2	32	ND	6.2	2
613	MEDIAN	499	140	136	ND	8.1	670	119	4.2	4.3	ND	5.2	ND	ND	ND	ND	ND
613	MIN	101	47	46	ND	ND	259	53	ND	ND	ND	ND	ND	ND	ND	ND	ND
C1.4	COLINIT	25	25	25	25	25	25	25	25	24	2.4	25	25	25	25	25	25
614 614	COUNT MAX	35 0.85	35 0.95	35 0.2	35 ND	35 ND	35 0.54	35 1.3	35 0.1	34 ND	34 ND	35 ND	35 ND	35 0.34	35 ND	35 ND	35 ND
614	MEDIAN	ND	ND	ND	ND	ND	ND	0.06	ND	ND	ND	ND	ND	ND	ND	ND	ND
614	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
014	171117	IVE	IVE	IVE	110	IVD	110	IVE	140	IVE	110	IVD	140	IVD	IVD	IVD	IVE
615	COUNT	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
615	MAX	3.9	1.7	0.3	0.1	ND	0.2	ND	0.6	ND	ND	ND	ND	ND	ND	ND	ND
615	MEDIAN	0.39	0.385	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
615	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
616	COUNT	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
616	MAX	0.54	0.1	ND	ND	ND	18	ND	ND	1.7	ND	ND	ND	1.5	ND	ND	ND
616	MEDIAN	0.1	ND	ND	ND	ND	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
616	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
617	COUNT	53	53	53	53	53	53	53	53	52	52	53	53	53	53	53	53
617	MAX	4.5	0.45	0.13	ND	6.6	2.97	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
617	MEDIAN	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
617	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
618	COUNT	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
618	MAX	0.2	6.1	0.2	ND	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
618	MEDIAN	ND	ND	ND	ND	ND	14.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
618	MIN	ND	ND	ND	ND	ND	3.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
619	COUNT	31	31	31	31	31	31	31	31	30	30	31	31	31	31	31	31
619	MAX	9489	4040	623	3.3	ND	9.1	31	4.4	1659	17	193	0.1	68	ND	0.1	6.5
619	MEDIAN	1043	855	100	ND	ND	ND	ND	ND	54.55	ND	ND	ND	ND	ND	ND	ND
619	MIN	320	380	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
013	101111	320	300	1,10	110	110	140	110	110	140	140	110	115	145	110	145	1,15
620	COUNT	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
620	MAX	76	40	ND	ND	ND	ND	ND	ND	0.26	0.28	ND	0.1	ND	ND	ND	ND
620	MEDIAN	3.125	0.135	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
620	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
621	COUNT	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
621	MAX	452	242	36	0.3	ND	296	81	ND	42	42	ND	7.5	ND	0.79	ND	0.3
621	MEDIAN	100	100	8.3	ND	ND	2.1	ND	ND	3.2	0.79	ND	ND	ND	ND	ND	ND
621	MIN	5.4	5.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
622	COLINIT	62	62	62	62	62	62	62	62	62	62		62	62	62	62	62
622 622	COUNT MAX	63 438	63 242	63 35	63 2	63	63 4.7	63 0.2	63 0.4	62 13	62 2.2	63 ND	63 0.3	63 ND	63 ND	63 ND	63
622	MEDIAN	102	93.4	6.78	ND	ND ND	1.57	ND	ND	1.55	ND	ND	ND	ND	ND	ND	1 ND
622	MIN	102	42.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
022	IVIIIV	12	42.0	ND	ND	ND	ND	ND	ND	ND	IND	ND	ND	ND	ND	ND	IND
623	COUNT	29	29	29	29	29	29	29	29	28	28	29	29	29	29	29	29
623	MAX	180	78	12	ND	ND	2.57	0.08	0.97	2.9	1.3	ND	0.2	2.4	ND	ND	0.1
623	MEDIAN	52.9	36	2.5	ND	ND	1.4	ND	ND	0.6	ND	ND	ND	ND	ND	ND	ND
623	MIN	26	18	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
624	COUNT	30	30	30	30	30	30	30	30	28	28	30	30	30	30	30	30
624	MAX	273	94	19	0.1	0.52	4.8	0.06	ND	5.7	2.7	ND	0.8	3.3	ND	ND	0.2
624	MEDIAN	76.3	46.5	4.68	ND	ND	2.925	ND	ND	1.15	0.305	ND	ND	ND	ND	ND	ND
624	MIN	23	19	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
625	COUNT	118	118	110	118	118	118	110	118	117	116	118	118	110	110	110	110
625 625	MAX	75.2	7.8	3.53	ND	0.17	72	118 194	63	22	28	4.86	0.73	118 13.8	118 11	118 ND	0.1
625	MEDIAN	ND	3.47	ND	ND	ND	8.2	31.1	0.54	6.9	13	ND	ND	ND	ND	ND	ND
625	MIN	ND	ND	ND	ND	ND	ND	0.1	ND	ND	0.24	ND	ND	ND	ND	ND	ND
				_													
626	COUNT	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
626	MAX	1.1	0.2	ND	ND	ND	2.6	0.8	ND	ND	0.7	ND	0.2	ND	ND	ND	ND
626	MEDIAN	ND	ND	ND	ND	ND	0.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
626	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
627	COUNT	55	55	55	55	55	55	55	55	53	53	55	55	55	55	55	55
627	MAX	2.3	7.8	1.9	ND	1.23	68	16	0.5	15	28	ND	2.6	0.23	ND	ND	2.9
627	MEDIAN	0.3	0.31	ND	ND	0.6	32	7.3	ND	3	2.38	ND	1	ND	ND	ND	ND
627	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
628	COUNT	38	38	38	38	38	38	38	38	36	36	38	38	38	38	38	38
628	MAX	1.4	1.24	0.63	ND	ND	6.9	9.2	1.7	0.51	1.58	0.13	ND	0.45	ND	ND	ND
628	MEDIAN	ND	0.165	ND	ND	ND	0.9	1.85	ND	ND	ND	ND	ND	ND	ND	ND	ND
628	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
520	.7111	1,15	1,15	.,5	.,5	.,,5	.,,,	.,,,	.,5	.,,,	.,,,				.,,5	.,5	.,5
629	COUNT	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
629	MAX	ND	ND	ND	ND	ND	0.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
629	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
629	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
630	COUNT	36	36	36	36	36	36	36	36	35	35	36	36	36	36	36	36
630	MAX	15	1.4	4.2	ND	ND	32	11.3	ND	ND	ND	0.48	ND	ND	ND	ND	ND
630	MEDIAN	6.5	0.645	1.215	ND	ND	13.15	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
630	MIN	0.8	ND	ND	ND	ND	1.4	0.65	ND	ND	ND	ND	ND	ND	ND	ND	ND
624	COLINIT	4.6	4.6	4.6	1.0	16	4.6	4.6	16	4.6	4.6	4.5	4.6	4.6	4.6	16	4.6
631 631	COUNT MAX	46	46 0.26	46 ND	46 ND	46 ND	46 7.2	46 2.5	46 ND	46 ND	46 ND	46 ND	46 ND	46 ND	46 ND	46 ND	46 ND
631	MEDIAN	1.1 0.2	ND	ND	ND	ND	2.435	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND
631	MIN	ND	ND	ND	ND	ND	2.433 ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
031	IVIIIV	ND	ND	ND	IVD	ND	ND	ND	IVD	ND	ND	ND	ND	ND	ND	IVD	ND
632	COUNT	49	49	49	49	49	49	49	49	47	47	49	49	49	49	49	49
632	MAX	119	2.4	5	ND	ND	51.7	0.2	ND	0.79	ND	0.9	0.2	ND	ND	ND	ND
632	MEDIAN	29.7	0.5	0.59	ND	ND	24.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
632	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
107A	COUNT	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74
107A	MAX	1.14	0.48	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
107A	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
107A	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
140R	COUNT	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
140R	MAX	220	830	65	4.1	ND	9.7	30	8.4	26	12	3.11	ND	ND	ND	ND	0.1
140R	MEDIAN	78	130	14	1.05	ND	4.815	5.2	1.05	12	2.7	ND	ND	ND	ND	ND	ND
140R	MIN	32.3	41.5	3.83	ND	ND	3.4	1.45	ND	ND	ND	ND	ND	ND	ND	ND	ND
P04	COUNT	28	28	28	28	28	28	28	28	28	26	28	28	28	28	28	28
P04	MAX	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P04	MEDIAN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P04	MIN	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

						Con	centrat	ions in	microg	grams p	er liter	(ug/L)					
Well Identifier	Statistical Measure	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroethane	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	Vinyl Chloride	Freon 113	Freon 123a	Methylene Chloride	Chloroform	Dichlorodifluoromethane (Freon 12)	Trichlorofluoromethane (Freon 11)	1,1,2-Trichloroethane	1,2-Dichloroethane
P08	COUNT	36	36	36	36	36	36	36	36	34	34	36	36	36	36	36	36
P08	MAX	12000	2200	2300	1.5	0.6	0.9	0.6	0.2	530	30	ND	1	0.1	6.7	ND	1
P08	MEDIAN	606.5	690.5	13	ND	ND	ND	ND	ND	15	2.45	ND	ND	ND	ND	ND	ND
P08	MIN	31	96	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P11	COUNT	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31
P11	MAX	3500	900	97	0.5	0.55	0.65	ND	ND	53	8.8	1.3	0.5	28	ND	ND	0.1
P11	MEDIAN	71.5	74.7	2.1	ND	ND	ND	ND	ND	0.4	ND	ND	ND	ND	ND	ND	ND
P11	MIN	9.7	6.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Key:

COUNT = Sample Count (including duplicate samples)

MAXIMUM = Maximum Concentration (micrograms per liter)

MEDIAN = Median Concentration (micrograms per liter)

MINIMUM = Minimum Concentration (micrograms per liter)

ND = Not Detected

APPENDIX H

Quality Control Analytical Chemistry Data for Environmental Blanks

Sample Location Sample Description Sample Date Laboratory Sample I.D.		EQ RINSE BLK WTR LVL IND 02/26/2018 9483436	EQ RINSE BLK WTR LVL IND 02/27/2018 9483454	EQ RINSE BLK WTR LVL IND 02/28/2018 9485202	EQ RINSE BLK WTR LVL IND 03/01/2018 9485213	EQ RINSE BLK WTR LVL IND 06/04/2018 9649942	EQ RINSE BLK WTR LVL IND 06/06/2018 9649960
Parameter	Units						
Volatile Organics							
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE) ug/L	0.3 J	0.3 J	0.3 J	0.2 J	ND@0.5	ND@0.5
TETRACHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHENE	ug/L	0.2 J	0.2 J	0.2 J	0.2 J	ND@0.5	ND@0.5
TRICHLOROFLUOROMETHANE (FREON 11)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D.		EQ RINSE BLK WTR LVL IND 06/07/2018 9649969	EQ RINSE BLK WTR LVL IND 06/08/2018 9651332	EQ RINSE BLK WTR LVL IND 07/16/2018 9715258	EQ RINSE BLK WTR LVL IND 07/17/2018 9715275	EQ RINSE BLK WTR LVL IND 07/18/2018 9715301	EQ RINSE BLK WTR LVL IND 07/19/2018 9714845
Parameter	Units						
Volatile Organics							
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	0.2 J	0.1 J	0.1 J	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE	ug/L	ND@0.5	ND@0.5	0.2 J	0.2 J	0.2 J	0.1 J
1,1-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	0.4 J	0.3 J	0.3 J	0.2 J
DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHENE	ug/L	ND@0.5	0.1 J	1.2	1	1	1.1
TRICHLOROFLUOROMETHANE (FREON 11)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D.		EQ RINSE BLK WTR LVL IND 11/27/2018 9917454	EQ RINSE BLK WTR LVL IND 11/28/2018 9917460	EQ RINSE BLK WTR LVL IND 12/03/2018 9928688	EQ RINSE BLK WTR LVL IND 12/04/2018 9928692	EQ RINSE BLK WTR LVL IND 12/05/2018 9928618	TRIP BLANK 2/26-3/1 02/26/2018 9483431
Parameter	Units						
Volatile Organics							
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE)	ug/L	0.5 J	0.4 J	0.4 J	0.4 J	0.4 J	ND@0.5
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE)) ug/L	0.2 J	0.2 J	0.2 J	0.2 J	0.2 J	ND@0.5
TETRACHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHENE	ug/L	ND@0.5	ND@0.5	0.09 J	0.08 J	0.2 J	ND@0.5
TRICHLOROFLUOROMETHANE (FREON 11)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D.		TRIP BLANK 2/27-3/1 02/27/2018 9483452	TRIP BLANK 2/28-3/2 02/28/2018 9485189	TRIP BLANK 6/4-6/8 06/04/2018 9649940	TRIP BLANK 6/6-6/9 06/06/2018 9651310	TRIP BLANK 6/7-6/9 06/07/2018 9651322	TRIP BLANK 6/8-6/9 06/08/2018 9651252
Parameter	Units						
Volatile Organics							
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROFLUOROMETHANE (FREON 11)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D.		TRIP BLANK 7/16-7/20 07/16/2018 9715253	TRIP BLANK 7/17-7/20 07/17/2018 9715291	TRIP BLANK 7/18-7/20 07/18/2018 9714834	TRIP BLANK 7/19-7/20 07/19/2018 9714837	TRIP BLANK 11/27-11/29 11/27/2018 9917433	TRIP BLANK 11/27-11/29 11/27/2018 9917506
Parameter	Units						
Volatile Organics							
1,1,1-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROFLUOROMETHANE (FREON 11)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5	ND@0.5

Sample Location Sample Description Sample Date Laboratory Sample I.D.		TRIP BLANK 12/3-12/6 12/03/2018 9928677	TRIP BLANK 12/4-12/6 12/04/2018 9928606	TRIP BLANK 12/5-12/6 12/05/2018 9928619	TRIP BLANK 12/5-12/7 12/05/2018 9930017
Parameter	Units				
Volatile Organics					
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1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1,2-TRICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,1-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLORO-1,2,2-TRIFLUOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
1,2-DICHLOROETHANE (EDC)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROETHANE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CHLOROFORM (TRICHLOROMETHANE)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
CIS-1,2-DICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
DICHLORODIFLUOROMETHANE (FREON 12)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
METHYLENE CHLORIDE (DICHLOROMETHANE)	_	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TETRACHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
TRICHLOROETHENE	ug/L	ND@0.5	ND@0.5	ND@0.5	0.2 J
TRICHLOROFLUOROMETHANE (FREON 11)	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5
VINYL CHLORIDE	ug/L	ND@0.5	ND@0.5	ND@0.5	ND@0.5

January 1, 2018 - December 31, 2018

Reporting Conventions

NA Not Analyzed

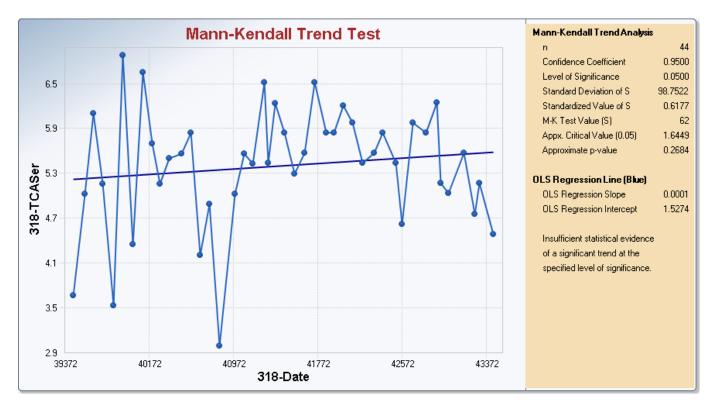
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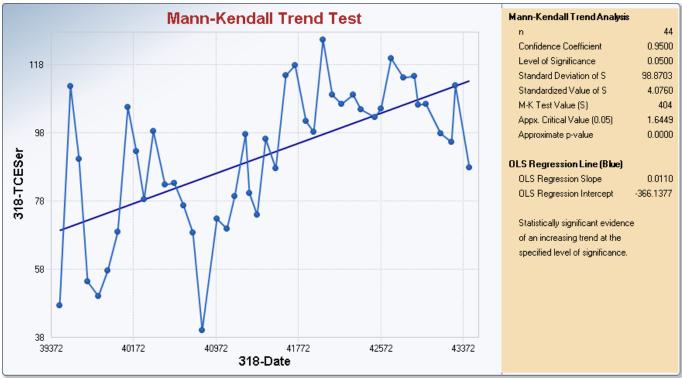
Code Explanation

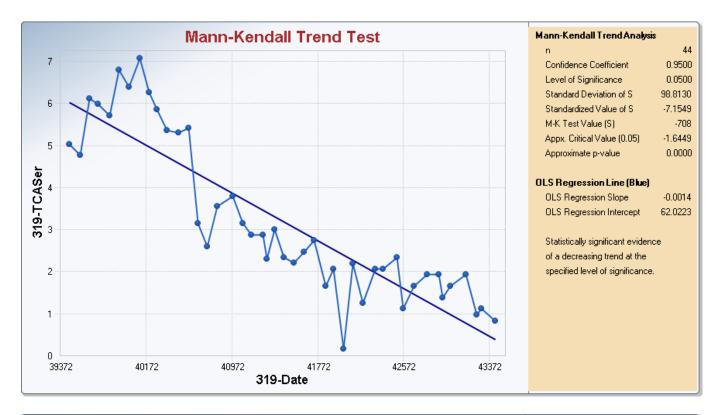
- The value is estimated. In most cases, the result either
 - (1) is greater than the method detection limit (MDL) and less than the limit of quantitation (LOQ), or
 - (2) exceeds the upper limit of the calibration range of the analytical instrument.

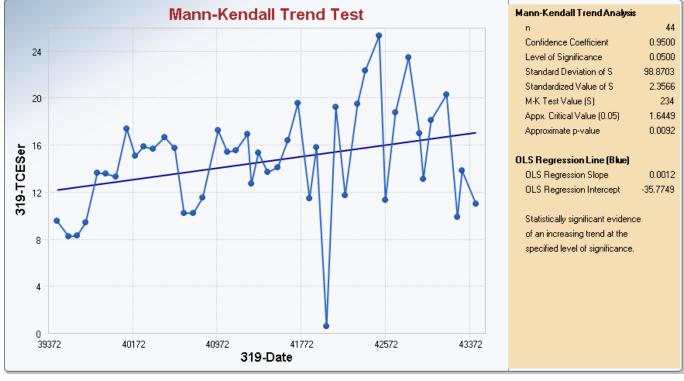
APPENDIX I

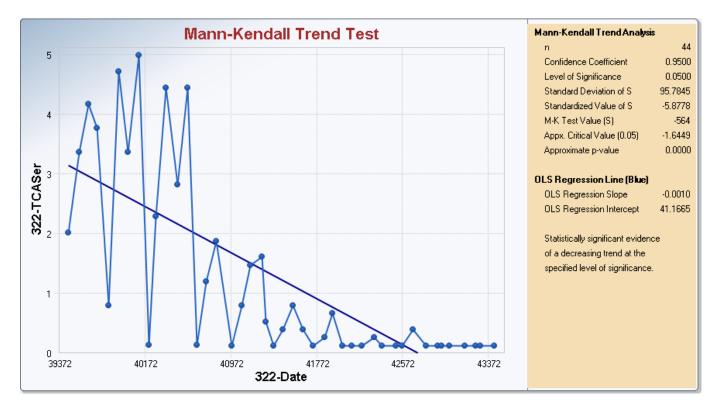
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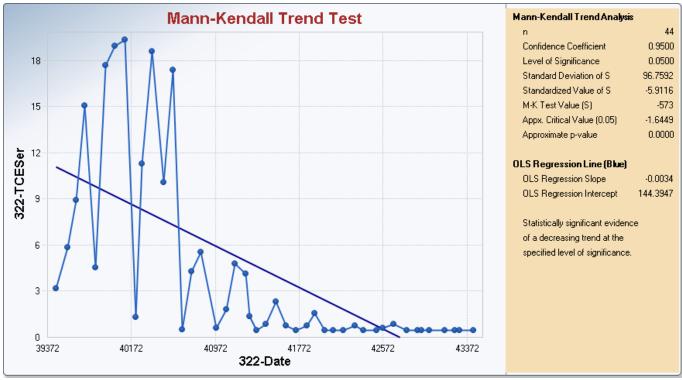


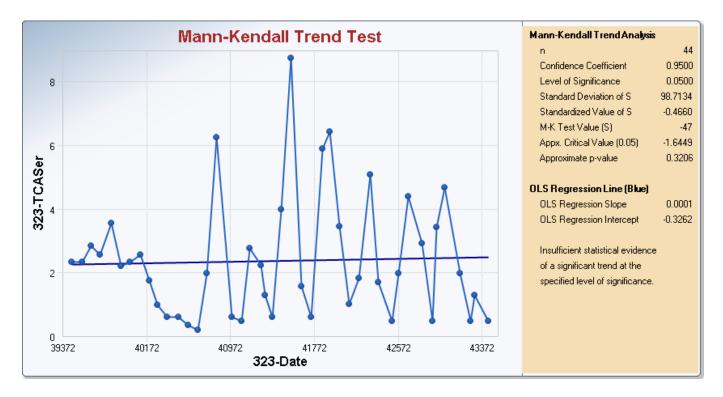


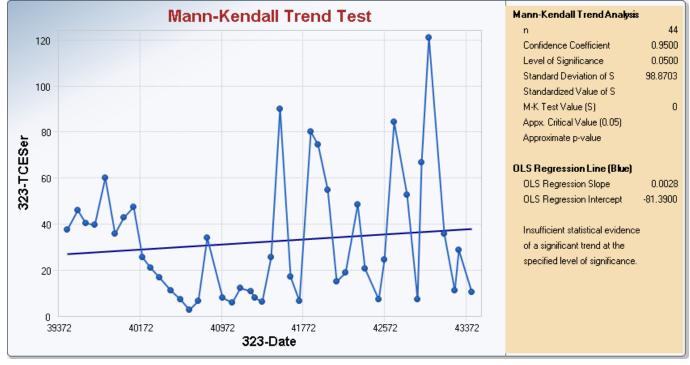


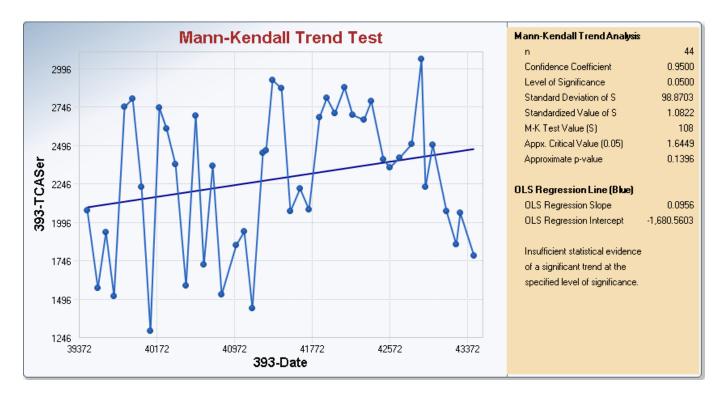


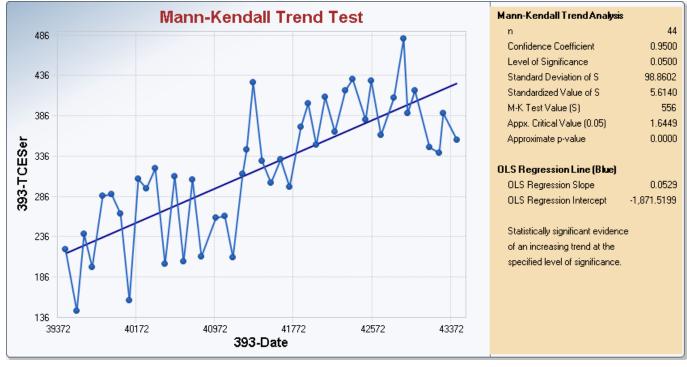


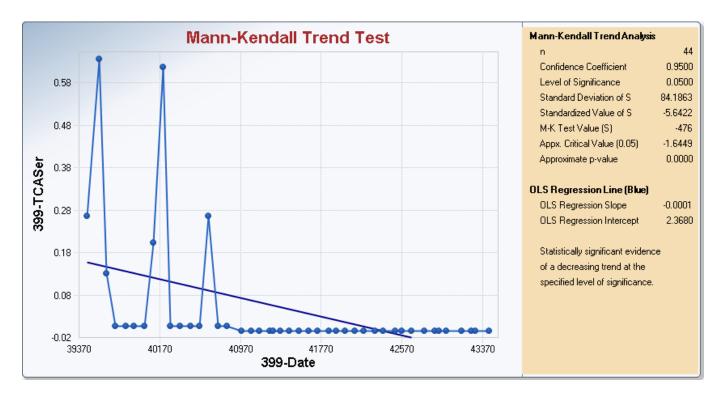


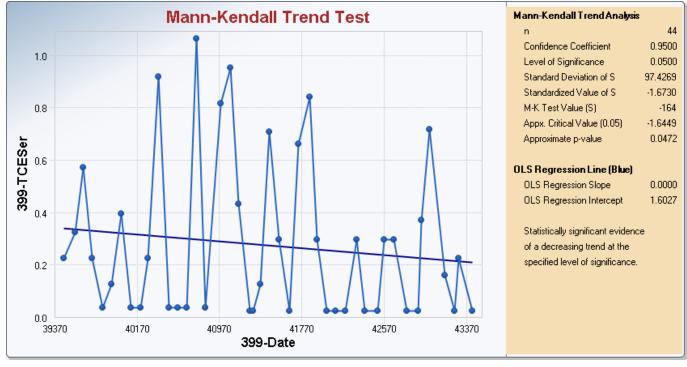


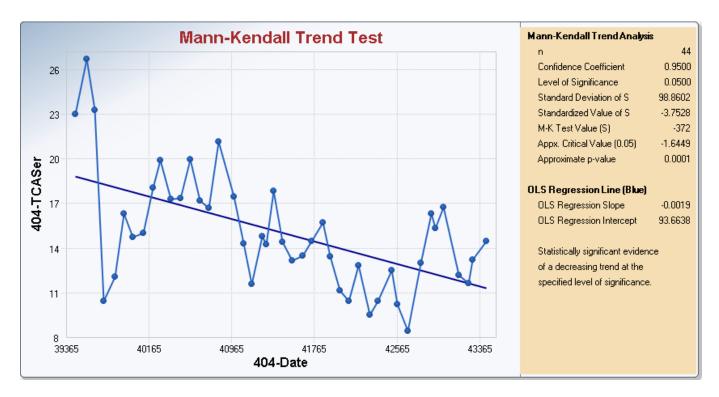


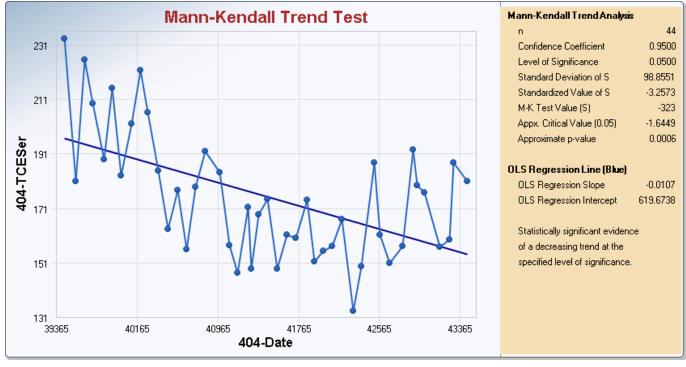


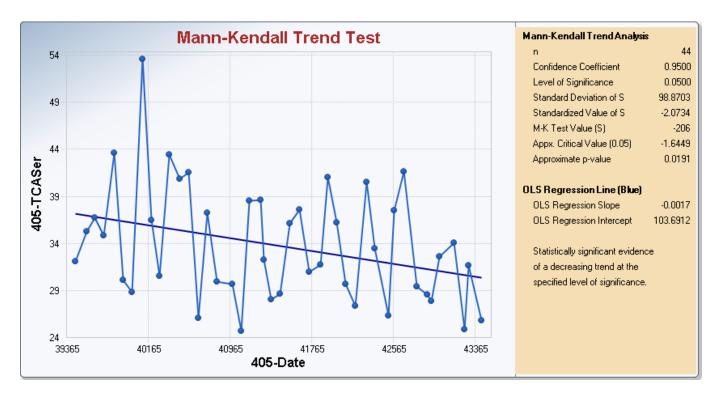


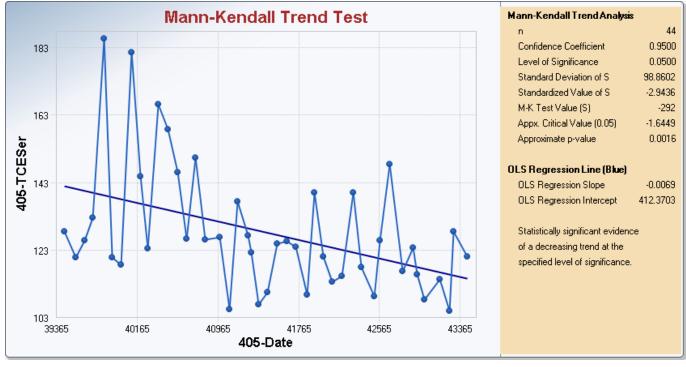


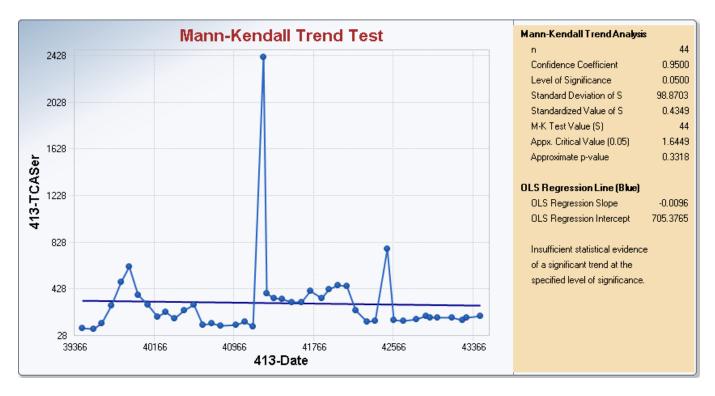


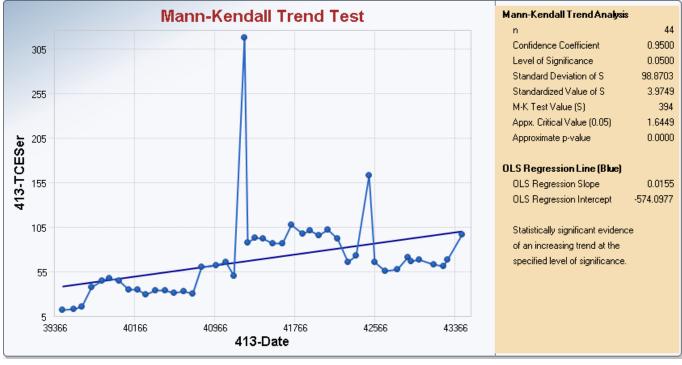


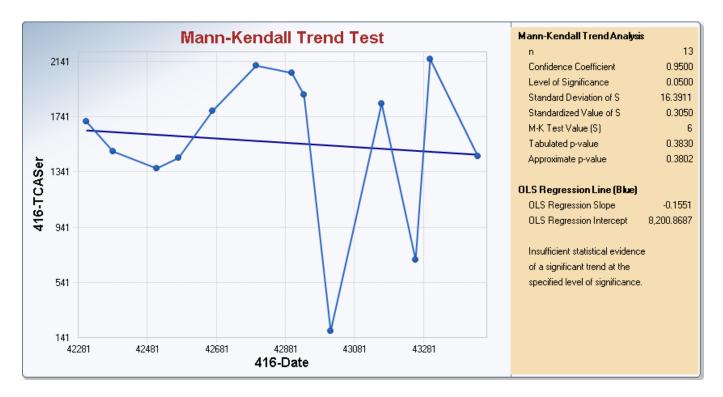


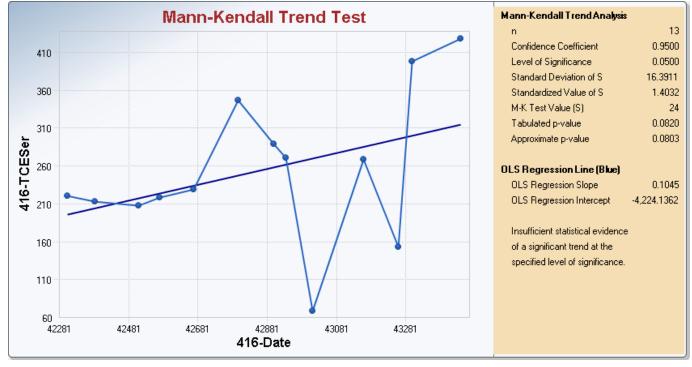


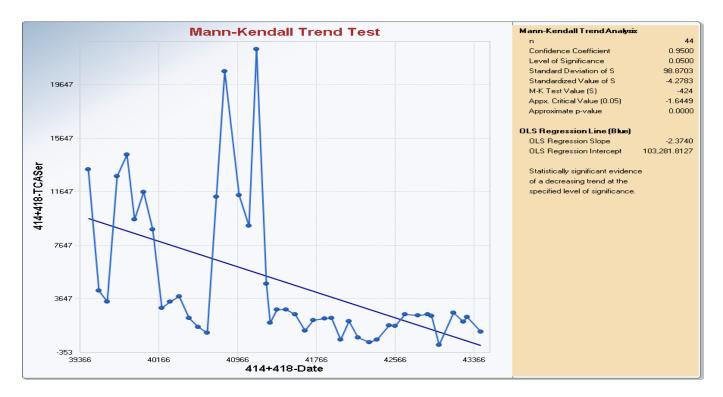


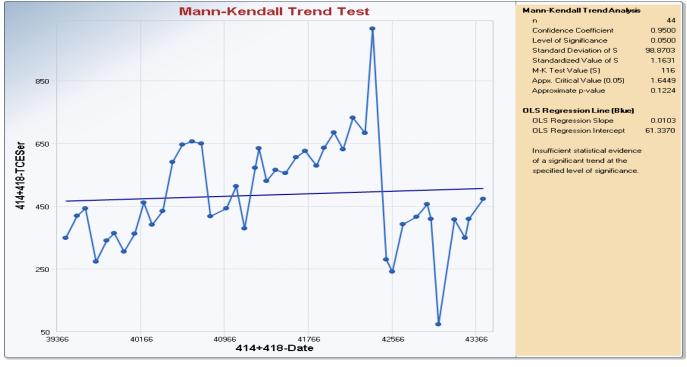


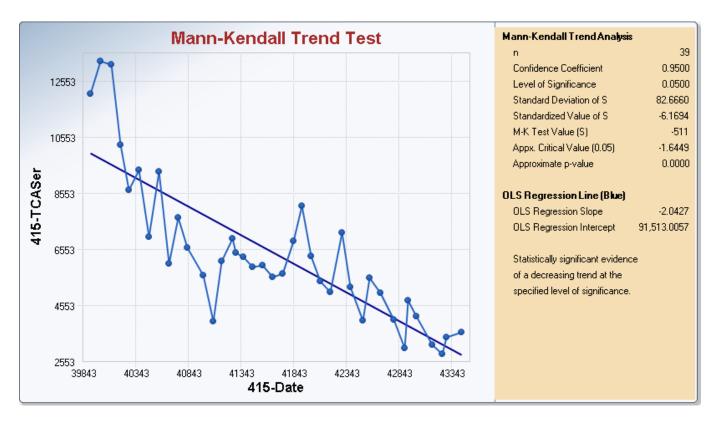


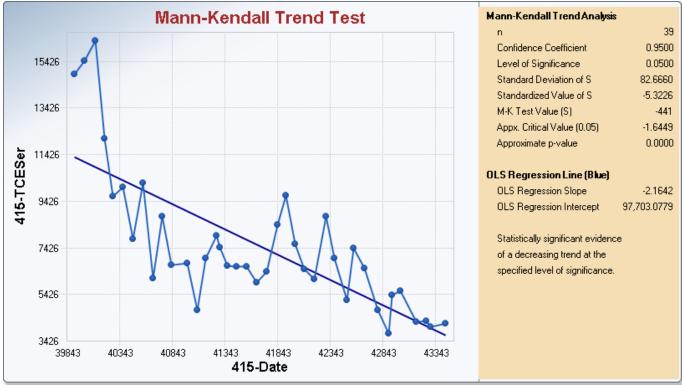


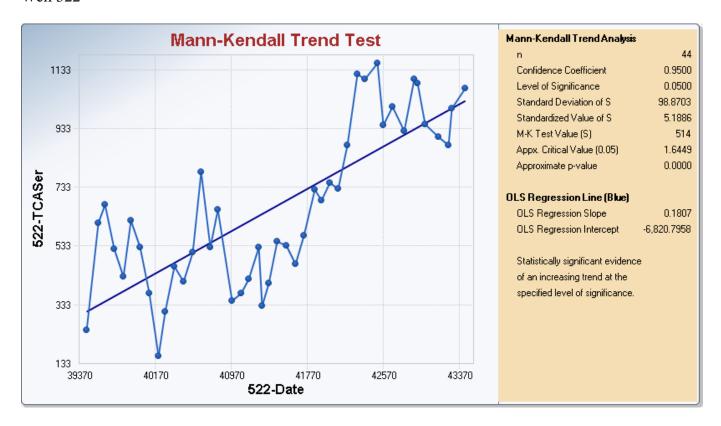


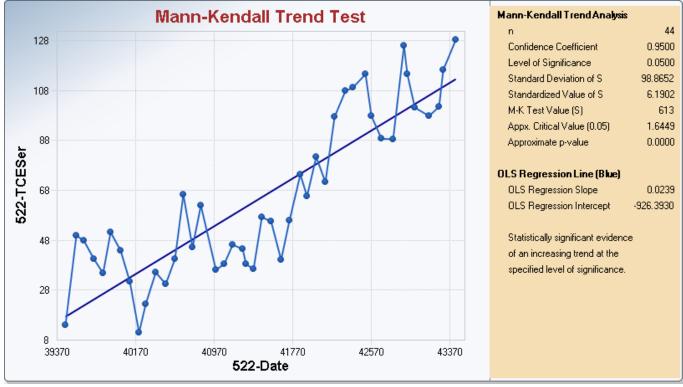


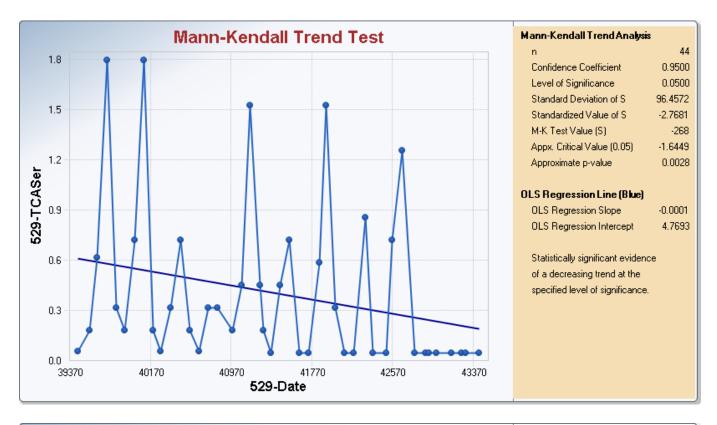


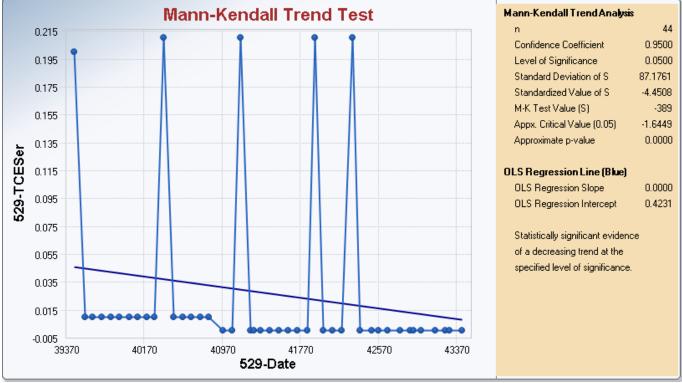


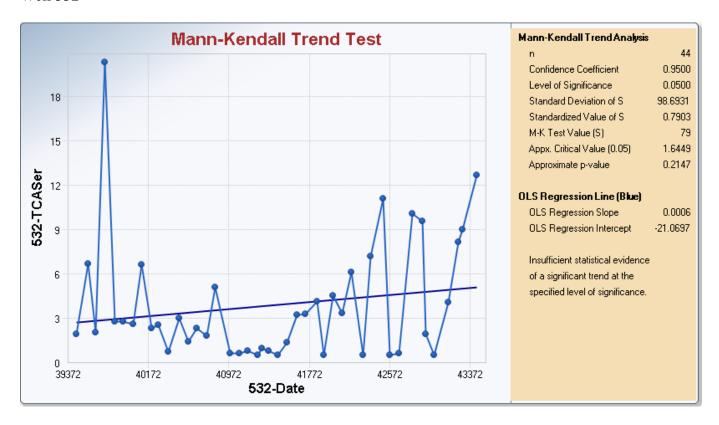


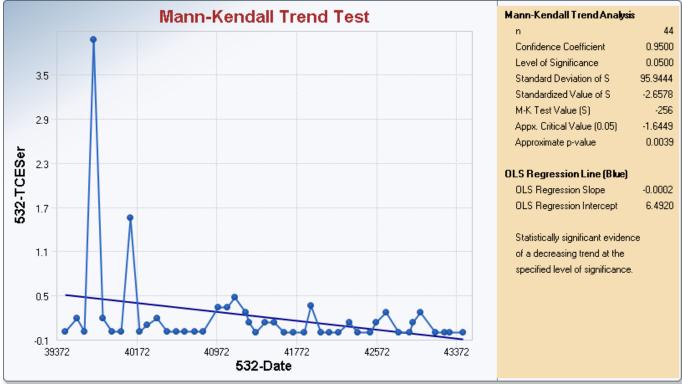


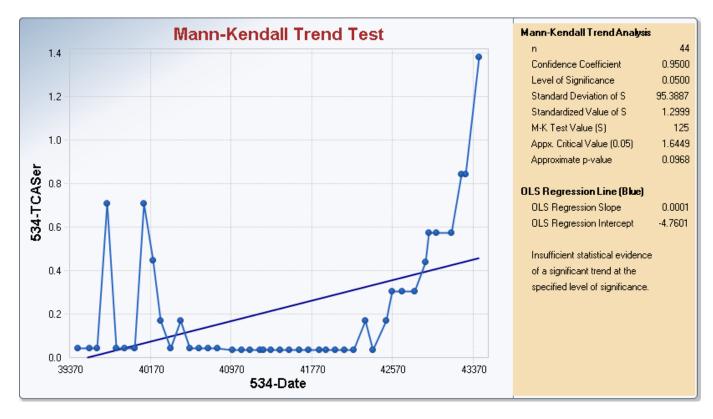


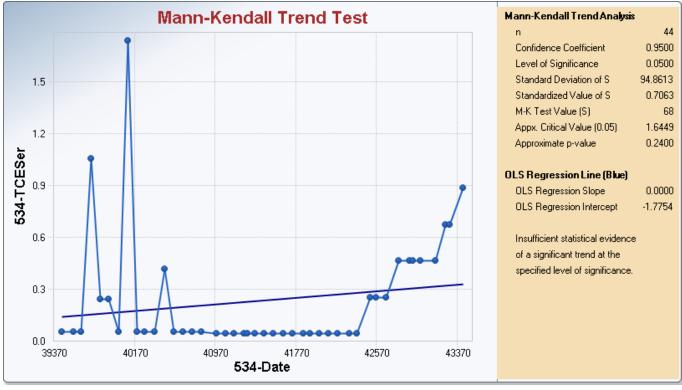


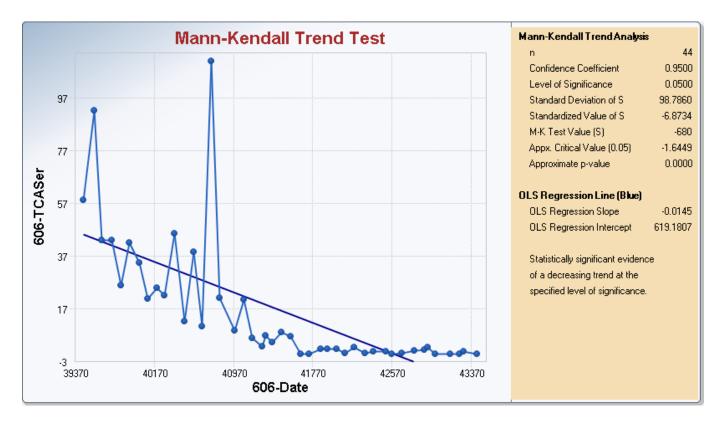


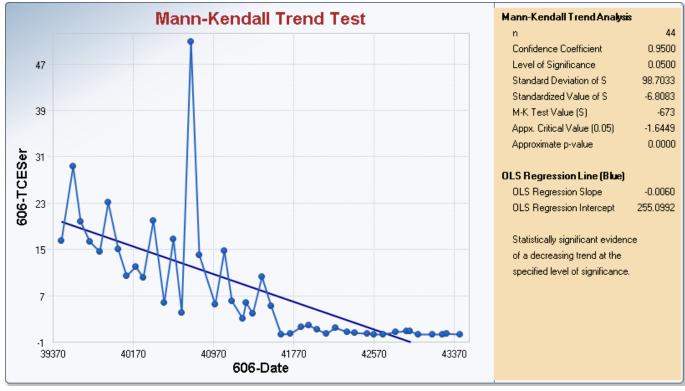


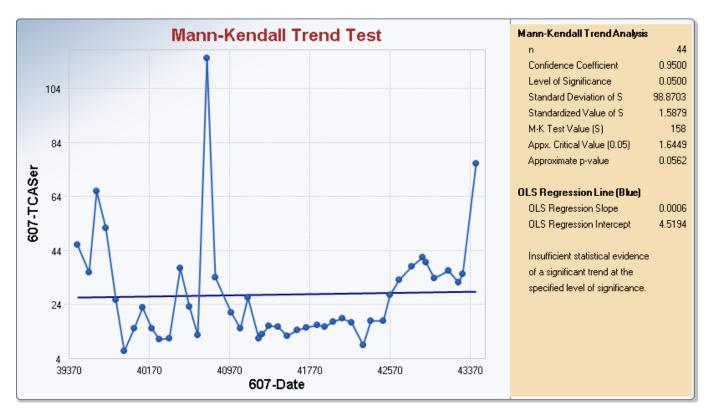


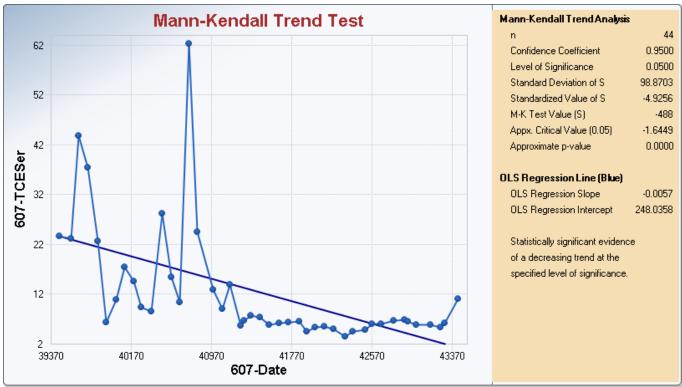


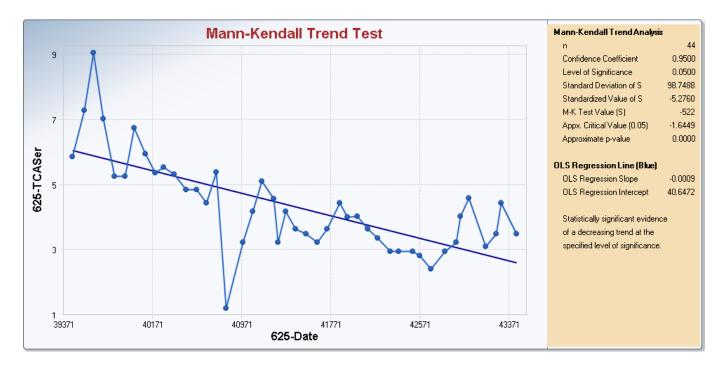


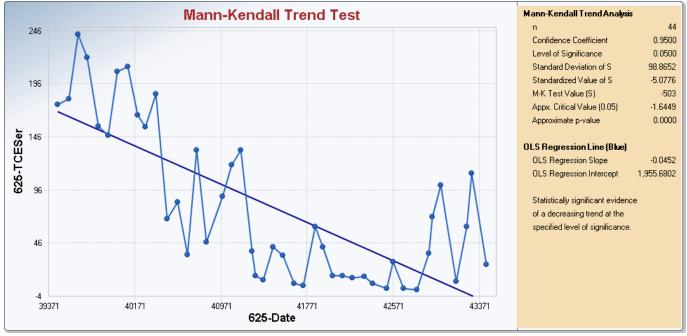












APPENDIX J

Extraction Well 417 Design, Installation & Performance Testing Report

Extraction Well 417 Design, Installation & Performance Testing

Introduction

Based on the results from geophysical tests, test borings, and hydraulic testing performed during the Remedial Alternatives Investigation (RAI) for the Northern Plume and Parking Lot 001 (P001) Area, an optimal location was identified for a new groundwater extraction well (417) completed in the till/bedrock zone. The selected location is at a low point in the bedrock surface and is concordant with a significant east-west fracture extending across the northern parking lot area that may offer a preferential pathway for transport across the Site and into the Moore Tire area. The location also coincides with the off-Site extension of the TCE plume and was determined to be a better location for intercepting VOC mass flux in the till/bedrock zone of the northern P001 Area than the line of extraction wells (413, 414, and 416) in place in 2018.

Well Siting

The location of extraction well 417 was selected after conducting a geophysical survey in the western parking lot of the P001 Area. The results of this survey are presented in Attachment A. The purpose of the survey was to locate a low point in the surface of the bedrock trough near the western edge of the Site, downgradient from extraction wells 413, 414, and 416. A seismic reflection survey was performed to map the bedrock surface by collecting seismic data from four seismic profiles in the lower parking lot area. The seismic data was supplemented with a Very Low Frequency (VLF) electromagnetic survey consisting of five survey profiles. Together, these surveys provided both a refined bedrock surface contour map and locations of potential bedrock fractures oriented east-west. The data suggested that an optimal site for an extraction well in the till/bedrock zone would be at the western edge of the parking lot near monitoring well 393. The bedrock surface elevation is less than 835 feet above mean sea level (amsl) in this area and seismic profile SR-4 detected a deeper bedrock elevation and an anomaly in the profile that suggested the presence of a weathered bedrock zone. Based on the results of the survey, two test wells were planned: one at the location of the seismic profile anomaly and one in the center of the area of the deepest bedrock surface elevation. The locations of these test wells are shown on Figure 1.

Test Wells

Test wells 700 and 701 were drilled to confirm the depth to bedrock and characterize the soil stratigraphy at each of the two possible locations for extraction well 417. Test well 700 was drilled approximately 10 feet east of monitoring well 393 at the location of the anomaly detected in seismic profile SR-4 whereas test well 701 was drilled in the deepest bedrock surface depression detected approximately 50 feet northeast of test well 700. Logs for each of these test wells, which were sampled continuously below a depth of 20 feet and completed as 2-inch diameter monitoring wells, are presented in **Attachment B**. Bedrock was encountered at a depth of approximately 63 feet below ground surface (bgs) in the boring for test well 700, and several shale boulders were encountered in the till unit above the bedrock surface. These boulders are believed to be the cause of the anomaly detected in the seismic profile, which indicated a solid layer above a softer layer immediately above the bedrock surface. Bedrock was encountered at a depth of approximately 62.5 feet bgs in the boring for test well 701, similar to the bedrock depth at test well 700.

Monitoring wells 700 and 701 were sampled for organic, inorganic, and field screening parameters to understand the groundwater geochemistry throughout the northern VOC plume area. Pulse (slug) tests were performed on monitoring wells 700 and 701 to provide additional hydraulic conductivity data for the northern VOC plume area and to determine the location with the highest hydraulic conductivity in an effort to select the most favorable location for the proposed extraction well. The slug tests were performed using a physical displacement slug and automated water level recorder, and were analyzed using aquifer test software. The test results yielded hydraulic conductivities of 6.5 feet/day for well 700 and 3.0 feet/day for well 701; these are typical rates for unconsolidated deposits consisting of silty sand or fine sand. A location near well 700 was ultimately selected for the location of extraction well 417 because of its higher hydraulic conductivity and because its location at the edge of the parking lot was more suitable for wellhead and surface infrastructure. Hydraulic testing results are presented in **Attachment C**.

Well Design

The design of the screen for till/bedrock extraction well 417 was based on analysis of sieve data from basal lodgment till samples collected from nearby monitoring well 324. This sieve data is presented in Attachment D and was originally used to design the lower screen of extraction well 414 in 1990. The screen for well 417 was partially set within the lower portion of the till unit located just above the bedrock surface. The till is typically well-graded and contains a significant fraction of fine material with occasional coarse clasts of shale. A screen interval from 58 to 64 feet bgs was identified with the lower portion positioned in the weathered bedrock and bedrock, thereby straddling the till/bedrock interface. The screen for extraction well 417 was designed based on procedures described in Chapter 13, Water Well Design, of the technical reference Groundwater and Wells, Second Edition (1986) by F.G. Driscoll. A 20-slot (0.020-inch) screen size was selected with a matching #00N pack sand specification for 90% cumulative percent retained. These sizes were selected to optimize the retention of finer particles in the till where the upper portion of the screen would be positioned. As shown on the design log for extraction well 417 presented in Attachment E, a five-foot sump section was planned below the screen and a solid riser pipe was planned to extend from the top of the screen to approximately two feet above ground surface. A well diameter of eight inches was selected to facilitate placement of the pump equipment and instrumentation.

Well Installation

Installation of well 417 began on September 25, 2018 using air rotary drilling methods with simultaneous casing advancement. This method advanced the 16-inch diameter drill casing with a special bit to hold back the formation as the well bore was advanced through the soil interval and into bedrock. The boring was drilled to a target depth of 64 feet, about one foot into competent shale bedrock. An open borehole was then advanced using conventional 12-inch diameter air rotary methods to a total depth of 70 feet, over-drilling the borehole by one foot to allow for potential collapse of the shale bedrock that might occur before the well casing could be installed. The stainless steel sump, well screen, and riser pipe were installed at a depth of 69 feet, and the sand pack was emplaced as the drill casing was retracted in stages to allow for a continuous and uniform width to the sand pack surrounding the screened interval. Following development of the sand pack, the annulus between the borehole and the well casing was sealed with bentonite chips and bentonite slurry as the drill casing was retracted up to approximately five feet below grade. The remainder of the borehole was then backfilled with sand to the ground surface to facilitate excavation around the

well casing for connection to the buried discharge conveyance line. Installation of well 417 was completed on September 26, 2018 and the final well construction log is shown in **Attachment F**.

Well Development

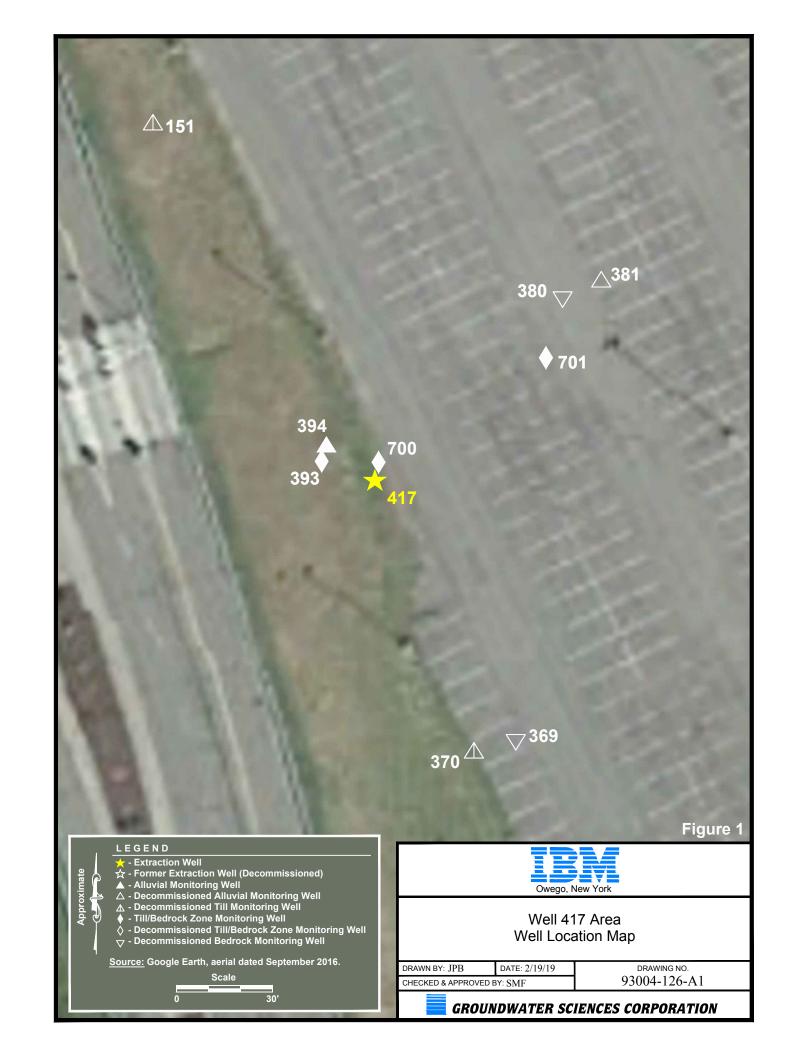
Development of well 417 began on October 1, 2018 by surging and bailing the well. Surging was performed to set the sand pack by removing fines from the sand pack and adjacent formation. Bailing was performed periodically during surging to clean out the well sump as material accumulated during surging and to assess the quantity of sediment entering the well from the formation. After surging and bailing was completed, the well was developed with a submersible pump to continue cleaning fines from the sand pack and to promote optimal flow into the sand pack and well screen from the surrounding aquifer. Well development ceased on October 2, 2018 when the clarity of the pumped water was clear.

Performance Testing

Following completion of well development, well 417 was pump-tested to assess its performance as an extraction well. This testing was done as a one-day step-drawdown pumping test on October 4, 2018. The test began at a constant pumping rate of four gallons per minute (gpm) for 60 minutes. After 60 minutes, the pumping rate was increased to 8 gpm for an additional 60 minutes. A total of five 60-minutes steps were attempted at rates of 4, 8, 12, 14 and 16 gpm. Only the 16 gpm step could not be sustained as the water level fell to the level of the pump intake, resulting in cavitation. Pumping continued under cavitation for several minutes with a maximum yield of 14.5 gpm and the pump set at the base of the well screen. The test ended after 255 minutes and recovery was monitored until the water level recovered to within approximately six feet of the pre-test static level.

The data collected during the test was plotted on a graph of drawdown versus time. The data and graph are presented in **Attachment G**. The drawdown graph was used to determine the change in drawdown for each pumping test step, extrapolate the late-time data for each step, and estimate a total drawdown for the long-term pumping test at a given flow rate. A straight line was fitted to the late-time data for each step and the projection of these straight lines was used to determine the trend in drawdown for each pumping rate and whether cavitation would occur at a particular rate. The goal of the step-test analysis was to select the highest sustainable pumping rate for long-term operation of the well. A rate of 12 to 14 gpm was selected to maximize drawdown in the well without cavitation of a pump set at the base of the screen interval, which is the maximum level of available drawdown.

The step-drawdown test data was also used to calculate the specific capacity of well 417 at various pumping rates and is plotted versus the corresponding discharge rate on the graph of specific capacity in **Attachment G**. The total drawdown at the end of each 60-minute step was determined for each of the first three steps and was used to calculate the specific capacity of the average pumping rate for each step. A straight line was fitted to the test data and the slope of this line was used to estimate the change in the capacity of the well at various discharge rates (e.g., the rate of decrease in the specific capacity as the discharge rate was increased). This specific capacity data will be used as a baseline for future assessments of changes in specific capacity during well rehabilitation activities.





3 Mystic Lane Malvern, PA 19355 (610) 722-5500 (ph.) (610) 722-0250 (fax)

December 14, 2017 Reference: 17-262-1

Mr. Stephen Fisher, P.G. Groundwater Sciences Corporation 2601 Market Place Street, Suite 310 Harrisburg, PA 17110

Subject: Geophysical Investigation Results

Former IBM Site (Lockheed Martin)

Owego, New York

Dear Mr. Fisher:

Advanced Geological Services (AGS) presents this letter report to Groundwater Sciences Corporation (GSC)summarizing the geophysical investigation completed by AGS on November 3, 4, 17, and 18, 2017 at the former IBM facility in Owego, New York.

The investigation area was situated in the parking lots located to the north of IBM Parkway East and east of Lakeview Parkway. The survey area is composed of fill, alluvium, till, shale bedrock. Based on information from previously site work conducted by GSC it was believed that a bedrock low may be present beneath parking lot lower parking lot adjacent to Lakeview Parkway. Nearby well information indicates the bedrock in the survey area is likely about ±60 feet below ground surface.

The objectives of the present geophysical investigation were to:

- 1. Map the bedrock surface within the parking lot to identify the lowest occurrence of the bedrock surface, and
- 2. Identify potential bedrock fractures that cross through the investigation area.

Methods

A combination of the seismic refraction method and the very low frequency (VLF) electromagnetic (EM) method were used to achieve the objectives of the investigation. The seismic refraction method was used to identify the bedrock surface and map the bedrock topography. The VLF EM method was used identify bedrock fractures that may coincide with topographic bedrock lows or weathered bedrock zones determined from the seismic refraction results.

Seismic Refraction Method

The seismic refraction method uses the propagation of elastic waves (shock waves) to map subsurface features. An energy source, such as the sledge hammer and strike plate used in this investigation, produces an elastic wave that propagates downward and outward from its initiation point at the ground surface. When the wave encounters a material having a different propagation velocity, part of the energy is refracted along the layer surface. The refracted

Mr. Stephen Fisher, P.G. December 14, 2017 17-262-1 Page 2 of 5

wave front returns to the surface where it is detected by a sensor (geophone). The velocity at which the seismic wave travels is a function of the density and elastic properties of the material. By geometrical calculations, it is possible to determine the acoustic velocity of, and thickness or depth to individual layers.

A DAQLink II seismograph manufactured by Seismic Source Co. and a Geode seismograph manufactured by Geometrics, Inc. were used to complete the seismic investigation. Both of these engineering seismographs have 24 channels and were configured with 24 10-Hz geophones. A 16-lb. sledge hammer and metal strike plate were used as an energy source to initiate a seismic wave. Each seismic spread consisted of 24 geophones. The spacing between geophones was set at 15 feet for a total spread length of 345 feet. Far offset shots, which are needed to provide bedrock refractor information near the ends of each seismic spread, were located 60 feet from geophone 1 (GP-1) and geophone 24 GP-24).

All seismic refraction data were processed using SeisOpt@2D, a commercially available program by Optim, Inc. SeisOpt@2D uses seismic first arrival times and survey geometry to derive subsurface information by using a non-linear optimization technique called generalized simulated annealing. The technique basically generates a velocity model of the subsurface, calculates travel time curves through forward modeling, then compares the calculated travel times to the observed travel times. The velocity model is then systematically modified through an inversion routine to decrease the statistical error to a predetermined level. Of course the resulting velocity model is reviewed by an AGS geophysicist to verify that the model is realistically compatible with known existing geologic conditions of the site.

The advantage to using this modeling method as opposed to other seismic refraction interpretation methods is that it can effectively image gradational seismic velocity variations laterally and vertically. Lateral and vertical variations in the seismic velocity are commonly observed in areas where a thick saprolite layer may be present above the unweathered bedrock, or where preferential weathering of the bedrock may have occurred within bedrock fracture zones.

Very Low Frequency (VLF) Electromagnetic (EM) Method

The VLF method detects electrical conductors, such as mineralized, or water filled bedrock fractures by utilizing the carrier wave of long distance communication radio signals in the range of 15 to 30 kilohertz (kHz). The transmitted radio signal induces electrical current flow into a linear electrical conductor, such as a water filled bedrock fracture, in the same manner as an antenna, which in turn produces a secondary magnetic field around the conductor. The VLF instrument compares the magnetic field strength of the primary (transmitted) signal to that of the secondary signal (induced current flow). When a conductor is crossed, the secondary magnetic field becomes measurably and predictably distorted relative to the primary field and is displayed on the instrument screen.

The VLF instrument records two components of the measured response known as the real and imaginary components that are related to the phase angle of the radio frequency carrier wave.

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The response when crossing a conductive fracture or fault is a peak response slightly before the fracture, an abrupt decrease when crossing the fracture, then a trough after the fracture before returning to the background response level. The fracture is located at the inflection or cross-over point of the response.

During this investigation a VLF radio signal frequency of 24.0 kHz transmitted from Cutler, Maine was used for all traverses. Measurements were made every 10 feet along each VLF traverse.

Results and Discussion

The primary investigation area was located in the lower parking lot situated immediately north of Lakeside Parkway. The geophysical investigation also extended into the parking lot located to the north of the lower parking lot to provide additional subsurface information in that area. The survey area and locations of seismic refraction lines and VLF traverses are shown on Figure 1.

Seismic refraction data were collected along lines SR-1 through SR-5 to determine bedrock topography (Figure 1). Lines SR-1 through SR-4 were located within the primary investigation area in the lower parking lot, and line SR-5 was located in the parking lot to the north of the lower parking lot to provide additional information regarding depth to bedrock in that area.

VLF data were also collected along five southeast to northwest oriented traverses identified as VLF-1 through VLF-5 (Figure 1). The VLF traverses were spaced to provide the ability to correlate potential bedrock fractures across the entire survey area.

Seismic Refraction Results and Bedrock Topography

Seismic refraction lines SR-1 through SR-4 were located in the lower parking lot and were oriented from south-southeast to north-northwest. Line SR-5 angled from southwest to northeast diagonally across the upper parking lot (Figure 1). Overall the quality of the seismic data were good. Despite some noise from road traffic and wind, it was possible to pick the first arrivals of the seismic response in each individual seismic trace (i.e. each geophone location). Modeled refraction results indicated that the velocity of the bedrock varied between 8,000 to greater than 10,000 feet per second (fps) depending on the degree of bedrock weathering. Bedrock elevations were determined using a bedrock velocity of 9,000 fps.

Depth to the top of weathered bedrock beneath the seismic profiles ranged between approximately 32 feet in profile SR-5 and approximately 60 feet in SR-1. Ground surface elevations along each of the seismic refraction profiles was determined from a map provided by GSC (map file: 002E Parking Lot Underground.pdf). The ground surface elevations were used during modeling to calculated bedrock elevations.

Seismically derived contoured bedrock elevations are shown on Figure 2. Generally the bedrock elevation decreases from east to west across the investigation area. The contoured bedrock map indicates that the lowest portion of the bedrock surface within the study area is

Mr. Stephen Fisher, P.G. December 14, 2017 17-262-1 Page 4 of 5

located along profiles SR-1 and SR-2, near the middle of the lower parking lot (Figure 2). Furthermore, if bedrock topography controls preferential ground water flow in this area, the ground water could flow into the lower parking lot area from the east and exit the western side of the lower parking lot in the area of well 393 and the northern half of seismic line SR-4 (Figure 2).

Individual seismic profile models are provided on Figure 3. Generally, the profiles show a slight weathered bedrock layer estimated to between 8,000 and 9,000 fps. The thickness of the weathered bedrock layer varies across the study area, but is generally approximately 3 to 5 feet thick.

Two potential low velocity zones were identified from the seismic profiles that could indicate areas of increased bedrock weathering. The first low velocity zone noted is located in the central portion of profile SR-4 (Figure 3). This low velocity zone is situated slightly to the southeast of the topographic bedrock low observed in profile SR-4. It is possible that this low velocity zone is related to preferential weathering along a potential fracture zone noted in the VLF results (Figure 4).

The second potential low velocity zone was noted at the northeast end of seismic profile SR-5, near the northeastern corner of the study area. It is possible that this low velocity zone could also be the result of preferential weathering, and does appear to coincide with the deepening of the bedrock surface in that area. However, being situated near the end of the seismic profile does make it a little more suspect that it could simply be a remnant of the modeling process. Drilling would be required to verify and better characterize the low velocity zones note in profiles SR-4 and SR-5.

VLE EM Results

VLF were collected along five traverses within the investigation area to identify potential bedrock fractures. The real component of the VLF Profiles are overlain along the map traces of the VLF traverses on Figure 4 along with potential fractures identified from the VLF data. Individual VLF profiles are presented on Figure 5.

Generally the strongest VLF responses noted in the data were caused by the presence of utilities near the ground surface. The potential anomalies attributed to potential bedrock fractures are of a smaller magnitude than those caused by utilities. The bedrock fracture responses in this area are somewhat muted because of the thick overburden combined with the water table being shallower than the bedrock surface. Slightly stronger bedrock responses would be expected if the water table were situated at or deeper than the bedrock surface.

Attempts were made to correlate the most prominent potential fracture responses across the investigation area. Note that some response variation between adjacent profiles and some of the potential fractures identified may not be readily identifiable in all profiles. Based on the identified responses, it appears that there may be a repeating joint pattern oriented approximately east-northeast to west-southwest, with more prominent joints spaced approximately ±75 feet apart. Of course potential fracture or joint spacing and orientation in

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the bedrock may be better determined or verified if a nearby bedrock outcrop is available for analysis. In-situ fracture orientations can also be determined within an un-cased well using either acoustic or optical televiewer sondes.

Summary and Closing

Five seismic refraction lines were completed to identify bedrock topography within the parking lots located to the north of Lakeside Parkway. Seismic result did identify a bedrock low situated in the central portion of the lower parking lot, and also verified that the bedrock generally slopes downward towards the western portion of the investigation area. Five VLF EM traverses were collected to identify potential bedrock fractures. Several potential fractures were identified and a repeating set of parallel joints oriented east-northeast to west-southwest could be present across the study area.

All geophysical data and field notes collected as a part of this investigation will be archived at the AGS office. The data collection and interpretation methods used in this investigation are consistent with standard practices applied to similar geophysical investigations. The correlation of geophysical responses with probable subsurface features is based on the past results of similar surveys although it is possible that some variation could exist at this site. Intrusive field activities, such as soil borings or other appropriate methods, would be needed to further investigate and confirm the presence or absence of identified and interpreted features. Due to the nature of geophysical data, no guarantees can be made or implied regarding the presence or absence of additional objects or targets beyond those identified.

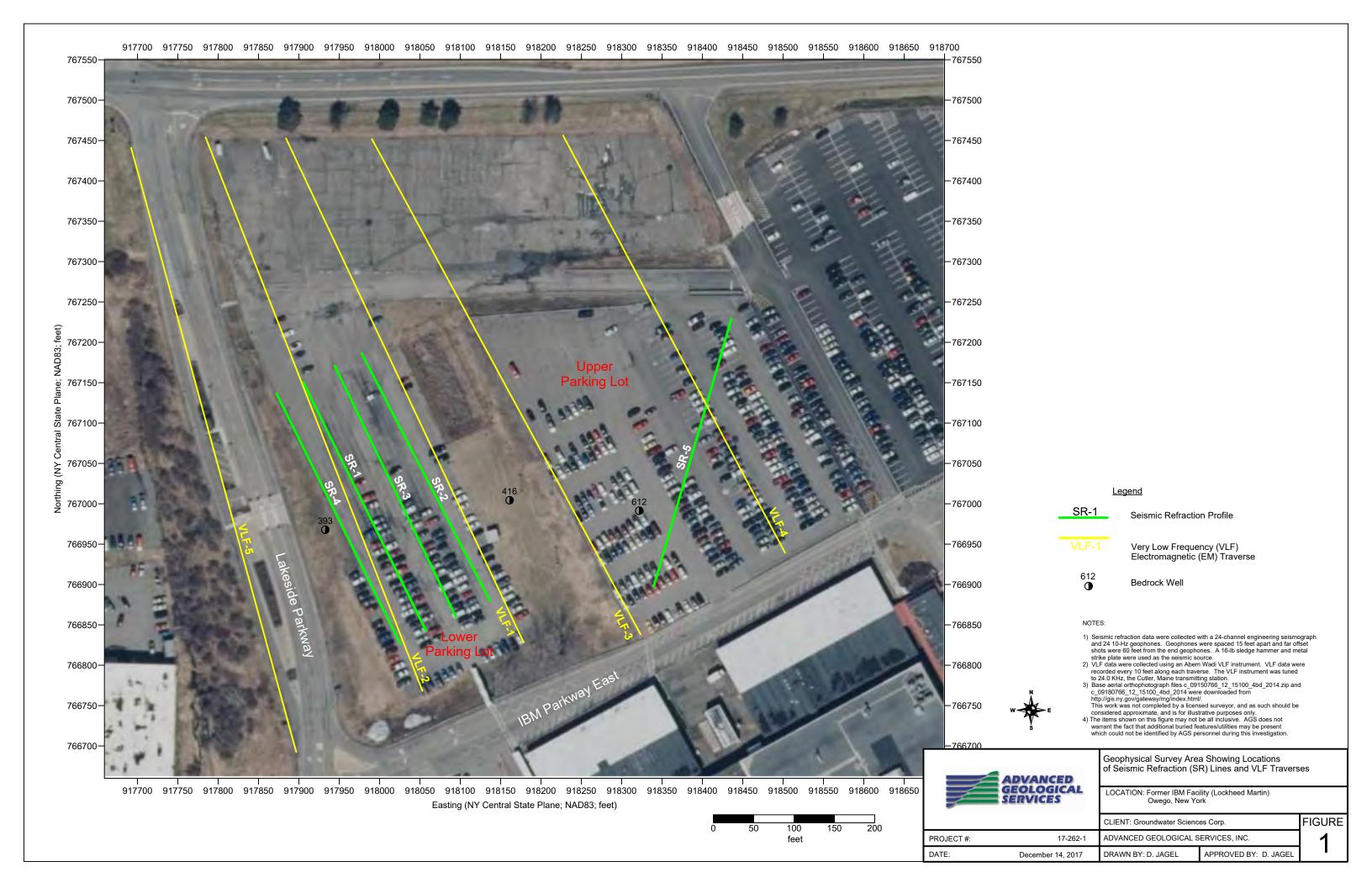
If you have any questions regarding the results of this field investigation, please contact me at 610-722-5500. It was a pleasure working with you on this project and we look forward to being able to provide you with sub-surface imaging services in the future.

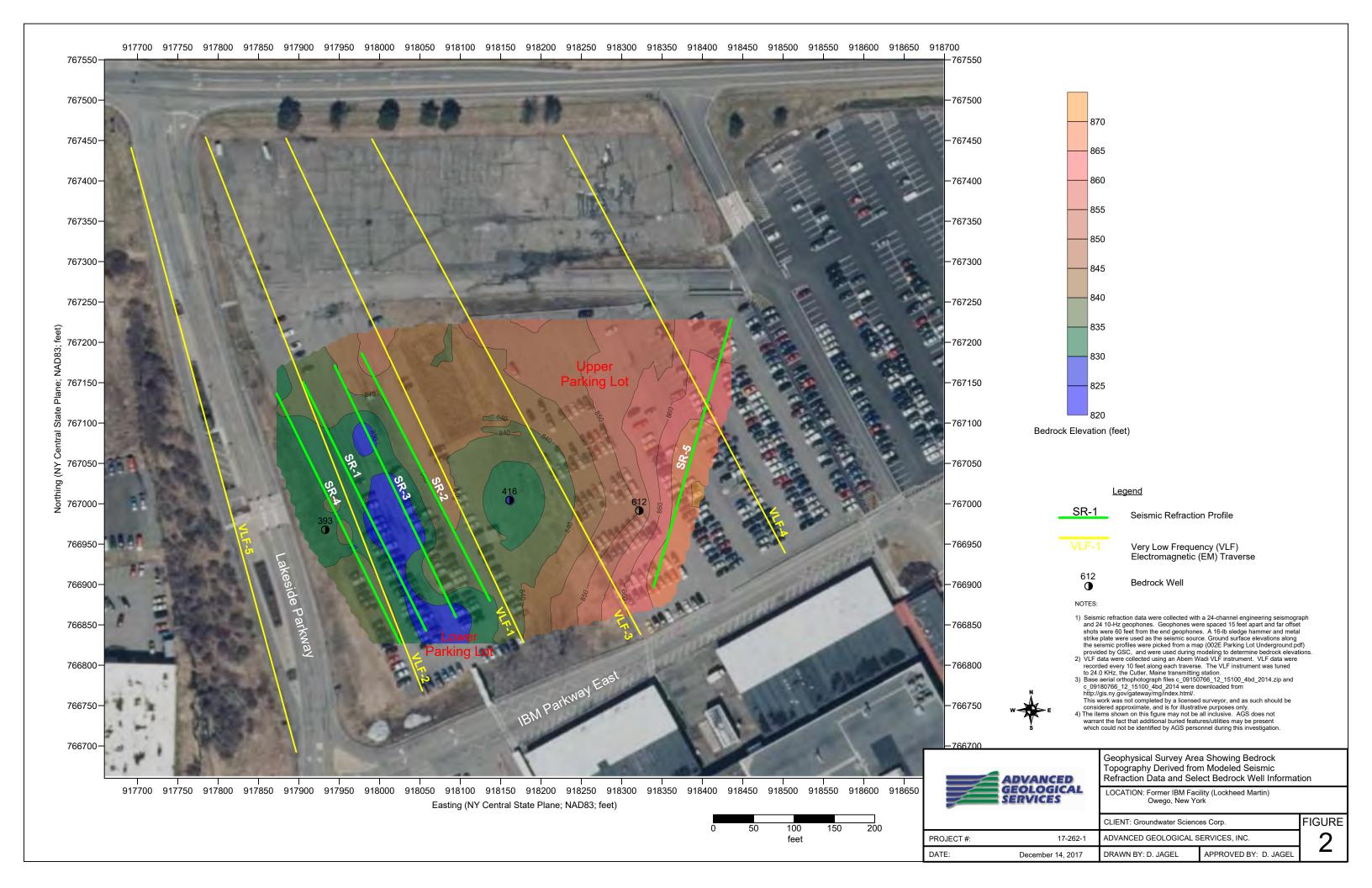
Sincerely,

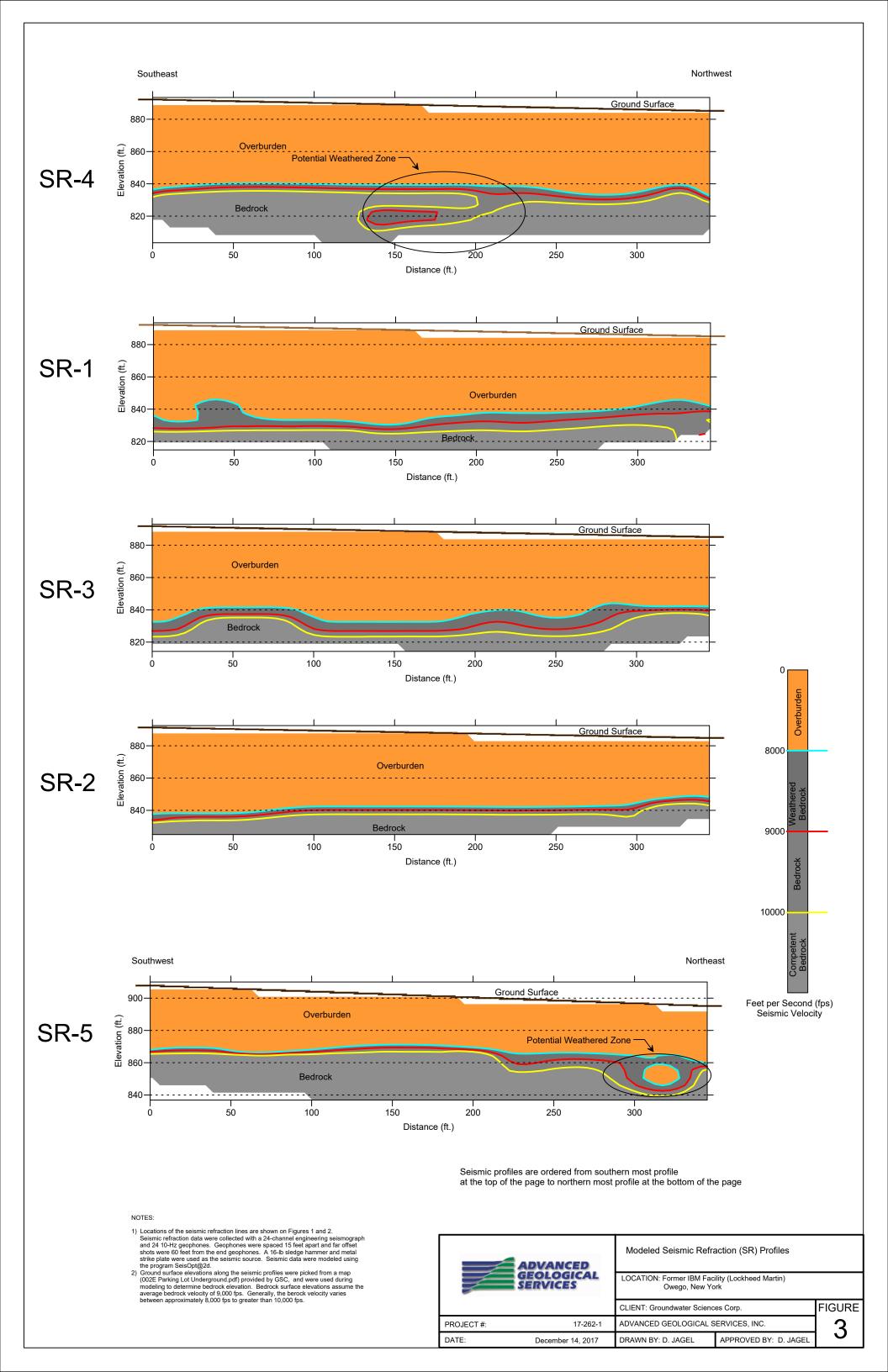
Donald Jagel, P.G. Principal Geophysicist

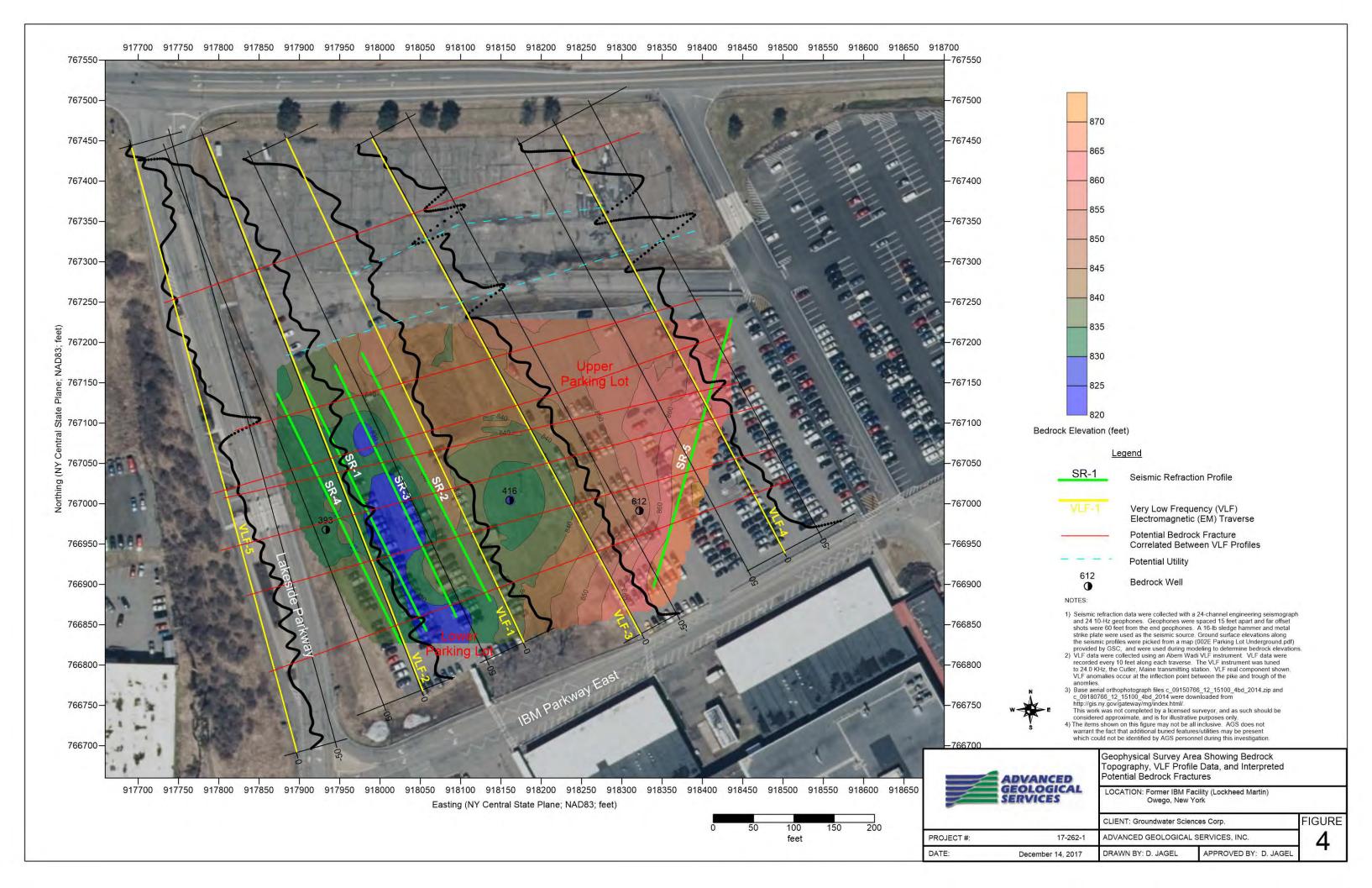
Donald Jagel

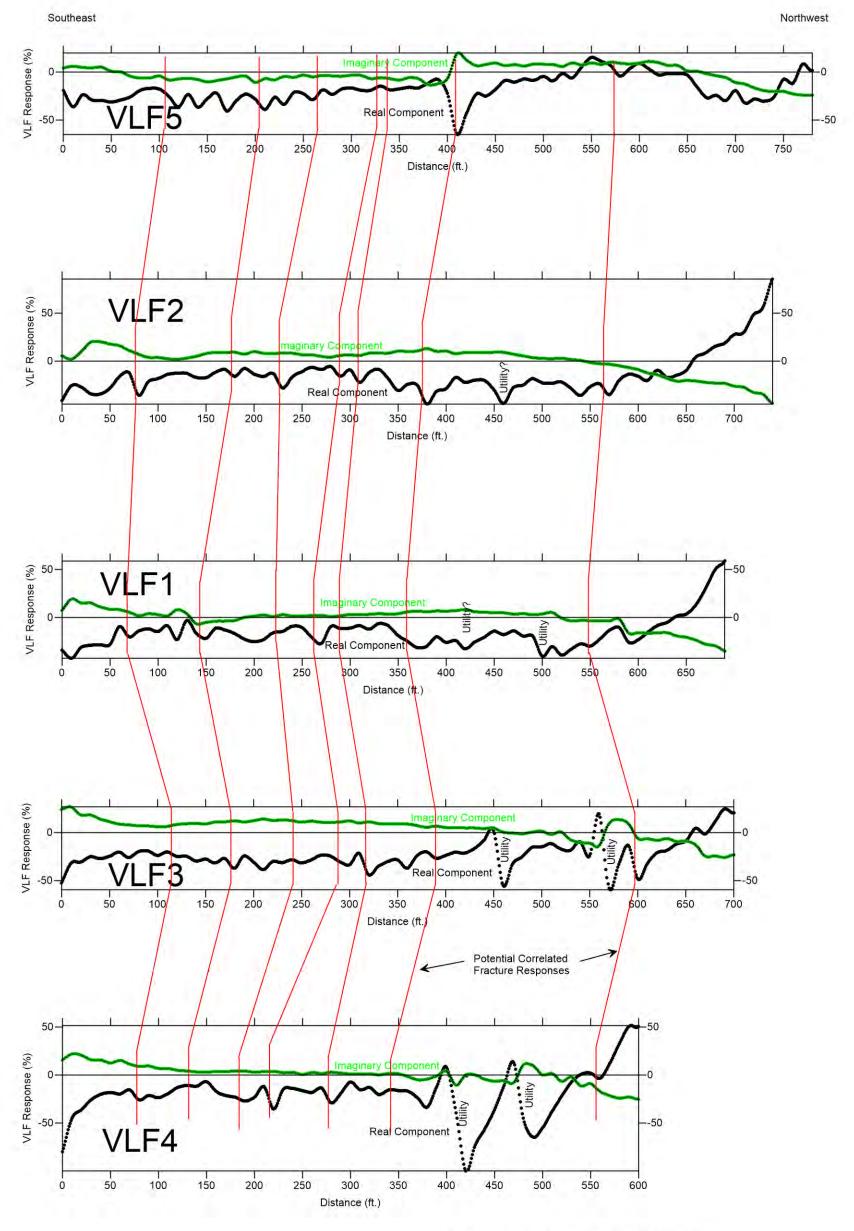
attachment: Figures 1 through 5











VLF profiles are ordered from southern most profile at the top of the page to northern most profile at the bottom of the page

NOTES:

1) Locations of the VLF traverses are shown on Figures 1, 2, and 4. The identified potential fractures (shown in red) correspond to the potential fractures shown on Figure 4. Note that not all anomalies can be correlated directly from one profile to the adjacent profile. Also, ther may be other potential fractures that can be correlated between profiles that have not been identified. Anomaly locations are generally indicated by the inflection point between peak and trough of any given anomaly.

	ADVANCED	VLF Profiles (Real and Imaginary Components) and Potential Correlated Bedrock Fractures LOCATION: Former IBM Facility (Lockheed Martin) Owego, New York					
	GEOLOGICAL SERVICES						
		CLIENT: Groundwater Scie	FIGURE				
PROJECT#:	17-262-1	ADVANCED GEOLOGICAL	5				
DATE:	December 14, 2017	DRAWN BY: D. JAGEL	APPROVED BY: D. JAGEL	9			



GEOLOGIC LOG: 700

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PROJECT INFORMATION					DRILLING INFORMATION						
PROJECT: Lockheed Martin Facility SITE LOCATION: Owego, New York JOB NO.: 94004.46.1701 LOGGED BY: S. Fisher DATES DRILLED: 4/16/18 - 4/18/18						DRILLING CO.: Par DRILLER: W. RIG TYPE: CM DRILLING METHOD: How DEVELOPMENT DATE: 4/2.			Parratt Wolff Inc. V. Rice CME 55 Hollow Stem Auger 1/25/18 P001 Area, approx. 10 ft E of well 393		
NOTES	w TOC.			SURFACE ELEVATION 889.3 ft amsl EASTING 917950.4813 NORTHING 766967.5284							
DEPTH FEET	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTI	ON	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS	
- -0 · - - - -2 · -	Augered to 20 ft				SILT, SAND & GRAVEL: dd kyellowish brown (10 YR 4 vf-m, lit c-vc with f-m A-SR crumbly, moist to dry	/2) silt and)QQQQQQ ::e ::e ::s	- -0 - - - -2 -		Flushmounted manhole with concrete surface apron (0'-1.0') Sand annular fill (0.5'-3')	
-4 6 8								-4 - - - - - - - - - 8 -		8" dia. HSA borehole (0'-49')	
- 10 - 10 12								- 10 - 10 12		Bentonite slurry annular seal (3'-55.5')	
- - 14 - - - - 16 -							000000000000	- 14 - - - 16 -			
- 18 - 18 20 22	3 4 7 7 5	0	12"	1	SILT, SAND & GRAVEL: m brown (10 YR 5/4) to dusky y 6/4) pred silt, tr clay, some vf SR gravel, tr. orgnics, dense, SILT, SAND & GRAVEL: as	vellow (5 Y -c sand, w/ A- stiff, moist		- 18 20 		2" dia. Sch. 40 PVC riser (0.5'-57')	



GROUNDWATER SCIENCES CORPORATION

GEOLOGIC LOG: 700

Page 2 of 3

DEPTH FEET	BLOW COUNTS	PID (mqq)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH FEET	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- 24	9 8 9	0	16"	2	turning more olive gray (5 Y 4/1) in lower 4", increasing silt and clay, more plastic, moist): 0: 0: -: 1: -: 1: -:	24		
- 24	6 7 9 11 8	0	11"	3	SILT & CLAY: olive gray to lt brownish gray (5 YR 6/1) pred silt w/ clay, dense, plastic, with olive black (5 Y 2/1) peat masses and rootlets, large 3" SA rock frag, moist		24 		
	11 12	0	20"	4	\SILT & CLAY: as above		- - -		
- 28	12 12 13 13	0	24"	5	SILT & CLAY: as above, less peat and rootlets, pred greenish gray (5 GY 6/1) to med gray (N5) silt, tr clay, w/ dk yellow orange (10 YR 6/6) mottling, tr f sand, stiff, moist		— 28 —		8" dia. HSA borehole (0'-49')
30	12 6 15 14	0	24"	6	SILT, SAND & GRAVEL: pred silt w/ vf-f sand, tr m-vc, w/ A-SA wthrd siltstone gravel, mottled, dense, moist		30		
- 32	14				SILT, SAND & GRAVEL: as above, less mottled below 14"	0:0 0:0 0:0 0:::2	32		
- 34	11 18 20	0	16"	7	SILT & GRAVEL: brownish gray (5 YR 4/1) silt, SA-SR fine gravel, tr vf-f sand, dense stiff, moist to wet	0.00	34		
- 36	9 10 11 16	0	23"	8	SILT, SAND & GRAVEL: pred. silt , w/ vf-f sand, w/ more SA siltstone frags, some m gravel, pred silt, tr clay lower 3", more homogeneous, dense, stiff, wet	0000	- 34 36		
	5 15 16 15	0	21"	9	SILT, SAND & GRAVEL: as above, pred. silt 15-21", dense, stiff, wet		- - - -		Bentonite slurry annular seal (3'-55.5')
-38	7 11 21 21	0	21"	10	SILT, SAND & GRAVEL: as above, silty 10-14", pred. granules 14-16", v. gravelly elsewhere, some vf-c sand, dense, sl crumbly, wet		38		
· 40 · 42	12 17 38 35	0	20"	11	SILT, SAND & GRAVEL: as above, pred f-m SA-SR clasts of shale and siltstone, v gravelly below 15", dense, stiff, wet		-		
	37 45 40 40	0	19"	12	SILT, SAND & GRAVEL: as above w/ more f-m A-SA gravel, dense, wet, turning mod yell brown (10 YR 5/4) lower 8", w/ wthrd clasts, wet				
44	15 24 26 28	0	22"	13	SILT, SAND & GRAVEL: dk yell brown to olive gray, sl less silt, w/ vf-vc sand, f-m SA-SR gravel, loose, crumbly, wet		44 		2" dia. Sch. 40 PVC riser (0.5'-57')
46	33 22 42 37	0	14"	14	SILT, SAND & GRAVEL: as above top 6", then olive gray silt, w/ vf-f sand, tr m-vc, w/ f-m SA-SR gravel, v. dense, stiff, moist to wet		46		
- 48	14 88 Spin casing	0	12"	15	SILT, SAND & GRAVEL: olive gray, silt, some vf-f sand, f-m gravel, v. dense, stiff, moist		48		
- 50	~F casing				SHALE: (boulder) med. dark gray (N4) horizontally bedded, some fracturing, irregular top and bottom contacts		- 50		5" dia. PQ Core corehole (49'-67.9')

GROUNDWATER SCIENCES CORPORATION

GEOLOGIC LOG: 700

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DEPTH FEET	BLOW COUNTS	Olld (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	БЕРТН	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- - - 52	PQ Core	0	39"/41"	RUN 1	SILT, SAND & GRAVEL: olive gray silt with vf-f sand, some m-vc sand, w/ f-m A-SA shale fragments, dense, wet				Bentonite slurry annular seal (3'-55.5')
- - 54 -	PQ Core	0	32"/36"	RUN 2	SILT, SAND & GRAVEL: olive gray silt with vf-f sand, some m-vc sand, w/ f-m A-SA shale fragments, dense, wet		54 54		2" dia. Sch. 40 PVC riser (0.5'-57')
- 56 - -	PQ Core	0	20"/24"	RUN 3	SHALE: (boulder) med. dark gray (N4) horizontally bedded, some fracturing, irregular top and bottom contacts		56 56 		Fine choke sand (55.5'-56')
- 58 - - - - 60					SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		58 - - - - - - - -		#OON Sand made
- - - - 62	PQ Core	0	60"/60"	RUN 4	SHALE: deeply wthrd boulder 60.2' to 61 ft SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		- - - - - 62		#00N Sand pack (56'-67.9')
- - - 64 -	PQ Core	0	60"/60"	RUN 5	SHALE: fractured shale boulder 61.5 ft to 62.2 ft SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		- - - - - - -		2" dia. 20-slot PVC
- 66 - -	1 Q Core		30 700		SHALE: med. dk gray (N4), competent, thin horizontal bedding, occ calcite fossil masses 6"-33", calcitic fossil layer 48.5"-49.5", possible clean natural fracture at 8"		66 66 		screen (57'-67')
– 68 - -							68		



GEOLOGIC LOG: 701

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	PROJ	ECT I	NFO	RMA	ΓΙΟΝ	DRILLING INFORMATION						
JOB NO.	CATION: <i>0</i> 1	1004.46.1 Fisher	ew York 1701			DRILLING CO.: Parratt Wolff Inc. DRILLER: W. Rice RIG TYPE: CME 55 DRILLING METHOD: Hollow Stem Auger/Core DEVELOPMENT DATE: 4/25/18 LOCATION: P001 Area, approx. 10 ft E of well 393						
NOTES	S: SWL= 25.1 TOC elevat					SURFACE EL EASTING NORTHING						
БЕРТН	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTI	ON	GRAPHIC	БЕРТН	WELL CONSTRUCTIO	WELL CONSTRUCTION DETAILS		
-0 0 2	Augered to 24 ft				Asphalt: asphalt pavement wi SILT, SAND & GRAVEL: m yellowish brown (10 YR 5/4) yellow (5 Y 6/4) silt with vf-v m A-SR gravel, crumbly, moi	noderate to dusky oc sand, and f-)0 00 00 0 s s s			Flushmounted manhole with concrete surface apron (0'-1') Sand annular fill (0.5'-3')		
-4 - - -6 - - -8										8" dia. HSA borehole (0'-59.5')		
- 10 - 12								- 10 - 10 12		Bentonite slurry annular seal (3'-57')		
- 14 - - - 16 - - - 18								— 14 — — — 16 — — — — — — — — — — — — — — — — — — —		2" dia. Sch. 40 PVC		
- 20 - 22								- - - - 20 - - - - - - - - -		riser (0.5'-60')		



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Page 2 of 3

БЕРТН FEET	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- 24 - 26	Augered to 24 ft 4 8 11 13	0	24"	1	SILT & CLAY: olive gray (5 Y 4/1) organic, silt with tr vf sand, tr clay, with peat masses and wood frags, color grading to greenish gray (5 GY 6/1) with dk yellow orange (10 YR 6/6) mottling, tr, roots, dense, stiff, moist		- 24 24 26		
· ·	9 12 19 15	0	24"	2	SILT, SAND & GRAVEL: mod. brown (5 YR 4/4) pred silt, tr vf-vc sand, w/ A-SA wthrd shale frags, dense, sl crumbly, moist		_		
- 28	3 9 12 9	0	23"	3	SILT, SAND & GRAVEL: as above, color grading to brownish gray (5 YR 4/1) at 15.5", dense, stiff, f gravel more SR, moist		- 28 - - -		8" dia. HSA borehole (0'-59.5')
- 30	9 10 13 13	0	24"	4	SILT, SAND & GRAVEL: as above with more A-SA f-m shale frags w/ SR f shale clasts, occ wthrd rock frag, tr clay, sl plastic, dense, moist		30		
- 32	11 12 16 12	0	17"	5	SILT, SAND & GRAVEL: as above, more gravelly 11-15", pred. shale frags, tr wthrd siltstone frags, dense, stiff, moist		-		
- 34	5 5 7 8	0	20"	6	SILT, SAND & GRAVEL: as above w/ less gravel, gravelly zone 13-18", dense, stiff, moist		- 34 - -		
- 36 - 38	6 8 10 10	0	21"	7	SILT & CLAY: olive gray to pale yellowish brown (10 YR 6/2), homogeneous, some clay, some color banding w/ pale red lams, pred vc sand near bottom with tr. vf-c sand, dense plastic, moist		- 36 - - - - 38		Bentonite slurry annular seal (3'-57')
- 40	6 9 12 11	0	15"	8	SILT & GRAVEL: olive gray (5 Y 4/1) silt w/ f-m SR shale gravel, 2" m-vc sand layer at top, large shale frags at bottom, less dense and stiff, wet	00000000000000000000000000000000000000	- - - - 40		
- 42	11 12 20	0	18"	9	SILT & GRAVEL: as above top 7", color changing to grayish orange (10 YR 7/4) silt w/ SA-SR f-m gravel, dense stiff, wet		- - - - 42		
- 44	12 27 30 18	0	16"	10	SILT, SAND & GRAVEL: dusky yellow (5 Y 6/4) to grayish orange silt w/ vf-vc sand, and f-m SA-SR gravel, occ. wthrd shale frags, less dense, sl crumbly, wet		- - - - 44		
- 46	10 20 24 37	0	14"	11	SILT, SAND & GRAVEL: as above, large SR m gravel 4-7", pred c-vc sand matrix, lit silt binder, all silt lower inch, cohesive, crumbly, wet		- - - - -46		2" dia. Sch. 40 PVC riser (0.5'-60')
	14 22 25 42	0	22"	12	SILT, SAND & GRAVEL: olive gray silt, some vf-vc sand w/ f-m SA-SR shale gravel, v. dense, stiff, moist		- -		
- 48	13 30 60/0.5' augered	0	18"	13	SILT, SAND & GRAVEL: olive gray as above, dense, stiff, sl porous 12-14", moist to wet		-		
- 50 -	28 62				SILT, SAND & GRAVEL: olive gray as above, w/ abundant m SA-SR shale frags,		- 50		



GEOLOGIC LOG: 701

Page 3 of 3

DEPTH FEET	BLOW COUNTS	Olld (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- - - 52	45 48	0	20"	14	dense, stiff, moist		- - - - 52		
- - -	35 72 31 33	0	19"	15	SILT, SAND & GRAVEL: as above, dense, very gravelly w/ A-SA shale frags, dense, stiff, wet		-		Bentonite slurry annular seal (3'-57')
54 	30 47 41	0	18"	16	SILT, SAND & GRAVEL: as above, large 3.5" shale frag in tip of spoon, moist		54 - - -		2" dia. Sch. 40 PVC riser (0.5'-60')
56 	32 28 30 38	0	19"	17	SILT, SAND & GRAVEL: as above, sl more vf-vc sand, dense, less stiff, wet		56		Fine choke sand (57'-58')
58 	37 49 84/0.5'	0	18"	18	SILT, SAND & GRAVEL: as above, oxidized dusky yellow (5 Y 6/4) color 4-10", texturally continuous, dense, wet				
60 	PQ Core	0	36"/	RUN 1	SILT, SAND & GRAVEL: olive gray pred silt with vf-m sand, w/ f-m SA-SR gravel, cobble at 19-24", dense, wet		60		#00N Sand pack (58'-67.7')
- 62 -	PQ Core	0	38.4"	KONT	WEATHERED SHALE: olive gray to dark gray, pred wthrd shale frags, some silt and vf sand, broken, loose, wet	0.0	62		2" dia. 20-slot PVC screen (60'-65')
- - 64 -					SHALE: dk gray (N3) horizontally bedded, occ. calcitic fossil frag, occ bedding plane fracture, moist to wet		64 64		
- - - 66 - -	PQ Core	0	60"/60"	RUN 2			- - - - - -		5" dia. PQ Core corehole (59.5'-67.7')
68 							68		



Slug Test Analysis Report

Project: Lockheed Martin Owego

Number: 93004.46.1701

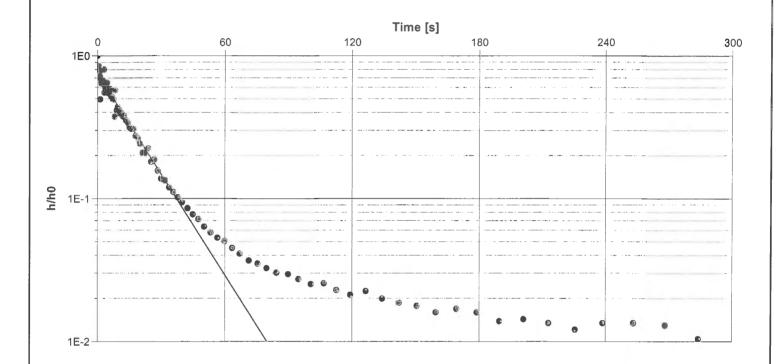
Client: IBM

Location: Owego, NY Slug Test: 700 Slug In Test Well: 700

Test Conducted by: S. Fisher Test Date: 7/5/2018

Analysis Performed by: S. Fisher Bouwer & Rice Analysis Date: 7/6/2018

Aquifer Thickness: 40.71 ft



Calculation using Bouwe	er & Rice	
Observation Well	Hydraulic Conductivity [ft/d]	
700	6.03 × 10 ⁰	



Slug Test Analysis Report

Project: Lockheed Martin Owego

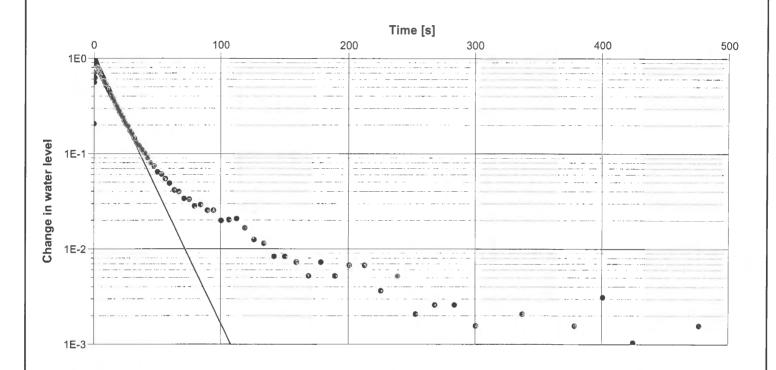
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Client: IBM

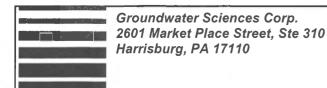
Location: Owego, NY Slug Test: 700 Slug Out Test Well: 700
Test Conducted by: S. Fisher Test Date: 7/5/2018

Analysis Performed by: S Fisher Bouwer & Rice Analysis Date: 7/6/2018

Aquifer Thickness: 40.71 ft



Calculation using Bouwe	Calculation using Bouwer & Rice										
Observation Well	Hydraulic Conductivity [ft/d]										
700	7.12 × 10 ⁰										



Slug Test Analysis Rep	ort
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Project: Lockheed Martin Owego

Number: 93004.46.1701

Client: IBM

Location: Owego, NY

Slug Test: 701 Slug In

Test Well: 701

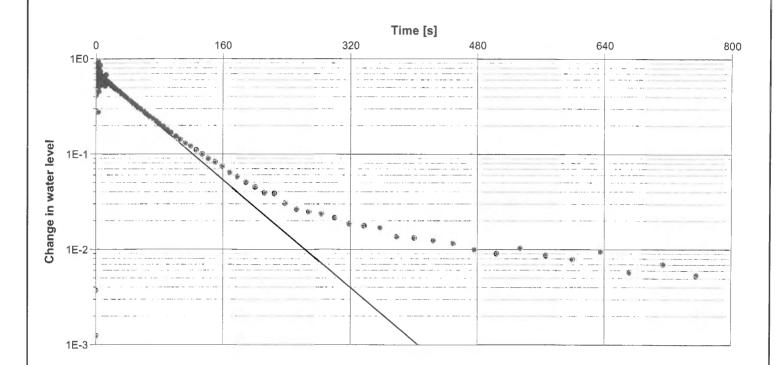
Test Date: 7/5/2018

Analysis Performed by: S. Fisher

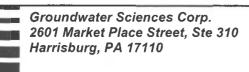
Bouwer & Rice

Analysis Date: 7/6/2018

Aquifer Thickness: 39.74 ft



Calculation using Bouwe	er & Rice		
Observation Well	Hydraulic Conductivity [ft/d]		
701	3.08 × 10 ⁰		



Slug Test Analysis Report

Project: Lockheed Martin Owego

Number: 93004.46.1701

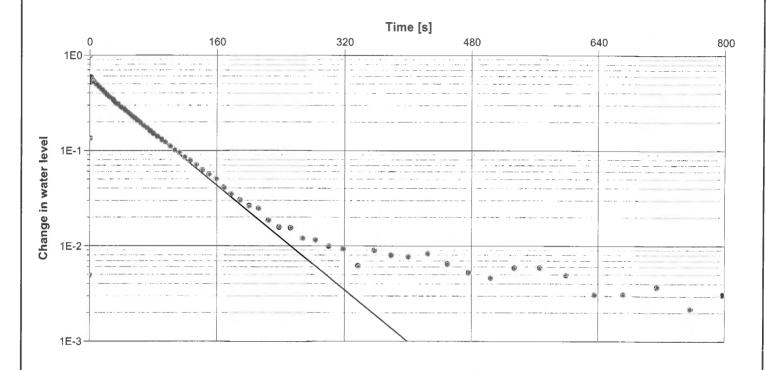
Client: IBM

Location: Owego, NY Slug Test: 701 Slug Out Test Well: 701

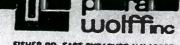
Test Conducted by: S. Fisher Test Date: 7/5/2018

Analysis Performed by: Bouwer & Rice Analysis Date: 7/6/2018

Aquifer Thickness: 39.74 ft



Calculation using Bouwer & Ric	ce	
Observation Well	Hydraulic Conductivity	
	[ft/d]	
701	2.99 × 10 ⁰	



FISHER RD., EAST SYRACUSE, N.Y. 13057 TELEPHONE AREA CODE 315/437-1429

Project Title Laboratory Testing - IBM

D422 Sieve Analysis ASTM

WE	LL 324			Sieve eve Si			_			eve	-				dzemal	- //
Sample	Depth ' (in feet)		1½"	1"			3/8"			#10	#30	#40	#60	#100	#200	<u> </u>
S-11	37.0 - 38.0			100	95.0	87.1	82.5	77.1	72.7	61.9	50.8	48.7	46.8		43.0	
S-12	38.0 - 44.0		100	93.0	86.0	80.0	75.6	69.0	65.3	55.8	46.1	44.2	42.2	40.5		
S-15	44.0 - 46.0			100	97.3		89.6					 	53.0	50.6	46.1	
S-16	46.0 - 48.0		100	95.9	83.3		72.3				 	 	34.5		31.2	
S-17	48.0 - 50.0		100	95.7	93.2		77.0						 		29.7	
	BR															-
			Sie	ve s	.ze -	- Per	ent r	Letain	el 4	Sieve	7					
5-11	37-38		_	0	5.0	12.9	17.5	22.9	27.3	38.1	49.2	5/.3	53.2	54.7	57.0	
- 12	38-49		0	7.0	14.0	20.0	24.4	31.0	34.7	44.2	53.9	55.8	57.8	57.5	62.7	
-15	44-46		_	0	2.7	4.2	10.4	17.1	21.4	32./	42.2	44.4	47.0	49.4	53.9	
- 16	46-48	->	0	4.1	14.7	23.6	27.7	34.4	38.6	50.8	61.2	63.4	65.5	67.0	68.8	
- 17	48-80	→	0	4.3	4.8	17.5	23.0	31.2	37.3	50.6	62.6	64.8	66.9	68.5	70.3	,
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· · ·	·															
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Remarks: _ Prewashed ASTM C-117
Yes X No No Performed By VJT, AFI



Johnson Filtration Systems Inc.
P.O. Box 64118 • St. Paul, MN 55164-0118
TEL. 612-636-3900 or 1-800-833-9473
TELEX 29-7451 FAX 612-636-0889
SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

SAND ANALYSIS

BY:

Job Name		18-	1												Date				
City	0	nego	,										State _	NY		Zip			
Driller															Phone				
Engineer _				we	11 41	77 L	Desig	7							Phone				
Remarks _				46	<u> </u>	48	cold	かわか											
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IIS In	OT 0:							N SIZ	EIN						AND MI				
	OT OI	PENING			AMPLE	= DEF	THS			Co	mmen	ts	Samp	le from	n well	324			

U.S. SIEVE	SLOT OF	PENING		SAMPLE	DEPTHS	
NO.	IN.	MM	46-48			
4	0.187	4.75	38.6			
10	0.078	2.00	50.0			
12	.066	1.68	-			
16	.047	1.19	_			
20	.033	0.84	_			
30	.023	0.60	61.2			
40	.016	0.42	63.4			
60	0.009	0,250	65.5			
70	.008	0.21				
100	.006	0.15	67.0			
200	0.003	0.075	68.8			

Comments	sample from	well 324	
#00 60	\$600N Send	Packe - 20	slot serien
59 in2/	't+ ×0.31 =	18.3 gm/ (2	L
		IONS: DIAM	

SLOT	SETTING	LENGTH



Johnson Filtration Systems Inc.
P.O. Box 64118 • St. Paul, MN 55164-0118
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TELEX 29-7451 FAX 612-636-0889
SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

SAND ANALYSIS

BY:

Job Nam	e	IBM								D	ate			
City	On	veg >							State	NY	,	Zip		
Driller _											. Phone _			
Engineer			Well	417 D	esign	7					. Phone _			
Remarks			48	-1 - 50	Den	127	(Bedra	k @ 5	o')					
					u.s. s	TANDAR	SIEVE	NUMBER	RS					
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SLOT OPENING AND	GRAIN SIZE IN	A THOUSANDTHS.	OF AN INCH AND MM

2.0

1.5

U.S. SIEVE	SLOT OF	PENING		SAMPLE	DEPTHS	
NO.	IN.	MM	48-50			
4	0.187	4.75	37.3			
10	0.078	2.00	50.6			
12	.066	1.68	- Streets			
16	.047	1.19	_			
20	.033	0.84	-			
30	.023	0.60	62.6			
40	.016	0.42	64.8			
63	3.009	2.250	66.9			
70	.008	0.21	_			
100	.006	0.15	68.5			
200	003	A 075	70.3			

Comments	54,	mple fr	-am by	11 32	4	
#00	**	#00N	Sond	Pack	(20-51.4	sereen)

MM.

SCREEN RECOMMENDATIONS: DIAM. _

SLOT	SETTING	LENGTH



GEOLOGIC LOG: 417 Design

Page 1 of 3

	PROJ	ECT 1	INFO	RMA'	ΓΙΟΝ		Ι	DRILL	ING INE	FORMA	TION
JOB NO.	CATION: <i>0</i>	1004.46.1 -	ew York			DRILLING CO.: DRILLER: RIG TYPE: DRILLING METHOD: Dual Rotary DEVELOPMENT DATE: LOCATION: P001 Area, approx. 10 ft N of well 700				N of well 700	
NOTES	Seil descrip				0 log	SURFACE EL EASTING NORTHING	EVAT	ION A		amsl	
БЕРТН	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	ON	GRAPHIC	БЕРТН	WE.		WELL CONSTRUCTION DETAILS
- 2 -								- 2 -			8" locking well cap
-0					SILT, SAND & GRAVEL: didk yellowish brown (10 YR 4 vf-m, lit c-vc with f-m A-SR crumbly, moist to dry	usky yellow to /2) silt and gravel, dense,		-02			Concrete surface apron (0'-1.0')
-4 4 6	Augered to 20 ft							-4 4 			16" dia. dual rotary borehole (0'-69')
-8 -10 -12											Bentonite slurry annular seal (1'-54')
- 14 - 16 - 18								14 16 18			8" dia. Sch 40, Type 316, stainless steel riser (+2.5'-58')



GEOLOGIC LOG: 417 Design

Page 2 of 3

DEPTH FEET	BLOW COUNTS	OIIA (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
20	3 4				SILT, SAND & GRAVEL: mod. yellowish brown (10 YR 5/4) to dusky yellow (5 Y		- - - - 20		
22	7	0	12"	1	6/4) pred silt, tr clay, some vf-c sand, w/ A-SR gravel, tr. orgnics, dense, stiff, moist		- - - 22		
	5 9 8	0	16"	2	SILT, SAND & GRAVEL: as above, turning more olive gray (5 Y 4/1) in lower 4", increasing silt and clay, more plastic, moist				16" dia. dual rotary borehole (0'-69')
24	6 7 9 11	0	11"	3	SILT & CLAY: olive gray to lt brownish gray (5 YR 6/1) pred silt w/ clay, dense, plastic, with olive black (5 Y 2/1) peat masses and rootlets, large 3" SA rock frag, moist		- 24 - - - - - 26		
20	8 11 12 12	0	20"	4	SILT & CLAY: as above SILT & CLAY: as above, less peat and rootlets, pred greenish gray (5 GY 6/1) to med gray (N5) silt, tr clay, w/ dk yellow				
28	12 13 13	0	24'	5	orange (10 YR 6/6) mottling, tr f sand, stiff, moist SILT, SAND & GRAVEL: pred silt w/ vf-f sand, tr m-vc, w/ A-SA wthrd siltstone		— 28 —		
30	12 6 15 14 14	0	24"	6	gravel, mottled, dense, moist SILT, SAND & GRAVEL: as above, less mottled below 14"		30		Bentonite slurry annular seal (1'-54')
32	9 11 18 20	0	16"	7	SILT & GRAVEL: brownish gray (5 YR 4/1) silt, SA-SR fine gravel, tr vf-f sand, dense stiff, moist to wet		32		
34	9 10 11 16	0	23"	8	SILT, SAND & GRAVEL: pred. silt , w/vf-f sand, w/more SA siltstone frags, some m gravel, pred silt, tr clay lower 3", more homogeneous, dense, stiff, wet		34		
36	5 15 16 15	0	21"	9	SILT, SAND & GRAVEL: as above, pred. silt 15-21", dense, stiff, wet	0:0:	- 36 - - -		
8	7 11 21 21	0	21"	10	SILT, SAND & GRAVEL: as above, silty 10-14", pred. granules 14-16", v. gravelly elsewhere, some vf-c sand, dense, sl crumbly, wet		— 38 — —		8" dia. Sch 40, Type 316, stainless steel riser (+2.5'-58')
0	12 17 38 35	0	20"	11	SILT, SAND & GRAVEL: as above, pred f-m SA-SR clasts of shale and siltstone, v gravelly below 15", dense, stiff, wet		40 		
12	37 45 40 40	0	19"	12	SILT, SAND & GRAVEL: as above w/ more f-m A-SA gravel, dense, wet, turning mod yell brown (10 YR 5/4) lower 8", w/ wthrd clasts, wet		42 		
44	15 24				SILT, SAND & GRAVEL: dk yell brown to olive gray, sl less silt, w/ vf-vc sand, f-m	B. = .	 44		

GEOLOGIC LOG: 417 Design

Page 3 of 3

DEPTH FEET	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- 46	26 28	0	22"	13	SA-SR gravel, loose, crumbly, wet	0	- - - 46		
	33 22 42 37	0	14"	14	SILT, SAND & GRAVEL: as above top 6", then olive gray silt, w/ vf-f sand, tr m-vc, w/ f-m SA-SR gravel, v. dense, stiff, moist to wet		- - -		16" dia. dual rotary borehole (0'-69')
48	14 88	0	12"	15	SILT, SAND & GRAVEL: olive gray, silt, some vf-f sand, f-m gravel, v. dense, stiff, moist	0:0	48 		Bentonite slurry
- 50	Spin casing PQ Core	0	39"/41"	 RUN 1	SHALE: (boulder) med. dark gray (N4) horizontally bedded, some fracturing, irregular top and bottom contacts		- 50 		annular seal (1'-54')
- 52	T Q Conc		03 /41		SILT, SAND & GRAVEL: olive gray silt with vf-f sand, some m-vc sand, w/ f-m A- SA shale fragments, dense, wet		52 		8" dia. Sch 40, Type 316, stainless steel riser (+2.5'-58')
· 54	PQ Core	0	32"/36"	RUN 2	SILT, SAND & GRAVEL: olive gray silt with vf-f sand, some m-vc sand, w/ f-m A-SA shale fragments, dense, wet				Bentonite chip annular seal, (54'-56')
56	PQ Core	0	20"/24"	RUN 3	SHALE: (boulder) med. dark gray (N4) horizontally bedded, some fracturing, irregular top and bottom contacts		— 56 - - -		#00N Sand pack (56'-69')
58 60					SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		— 58 - - - - - 60		
62	PQ Core	0	60"/60"	RUN 4	SHALE: deeply wthrd boulder 60.2' to 61 ft SILT, SAND & GRAVEL: olive gray silt w/vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		- - - - - - 62		8" dia. Sch 40, Type 316, 20-slot, stainless steel wire-wrapped screen (58'-64')
					SHALE: fractured shale boulder 61.5 ft to 62.2 ft		-		
64					SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		64 		
66	PQ Core	0	60"/60"	RUN 5	SHALE: med. dk gray (N4), competent , thin horizontal bedding, occ calcite fossil masses 6"-33", calcitic fossil layer 48.5"-49.5", possible clean natural fracture at 8"		- 66 - -		8" dia. Sch 40, Type 316, stainless steel sump (64'-69')
- 68							68 		



WELL LOG: 417

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	PROJ	ECT I	INFO	RMA	ΓΙΟΝ		Γ	RILL	ING INF	FORMA	TION
JOB NO.	Γ: <i>Lα</i> CATION: <i>O</i> : <i>94</i>	ockheed wego, Ne 1004.46.1 Fisher	Martin . ew York 1701	Facility, 1	P001 Study	DRILLING CO.: Eichelbergers, Inc. DRILLER: C. Knaub RIG TYPE: Ingersoll Rand T4 DRILLING METHOD: Air Rotary DEVELOPMENT DATE: 10/2/18 LOCATION: P001 Area, approx. 5 ft S of monitoring well					
NOTES	SwL=24.99 WL Measur	ft belov	w TOC,	10/4/18	oring well 700 log 78 ft amsl	SURFACE EL EASTING NORTHING	EVAT	9	39.4 ft amsl 17949.34 56961.71		
БЕРТН	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTI	ON	GRAPHIC	БЕРТН	WEI		WELL CONSTRUCTION DETAILS
- 2 -								- 			8" locking well cap
-0					SILT, SAND & GRAVEL: di dk yellowish brown (10 YR 4 vf-m, lit c-vc with f-m A-SR	/2) silt and		- 0 -	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Topsoil backfill (0'-1')
-2 - - - -4	Augered to 20 ft				crumbly, moist to dry			- -2 - - - - -4			Sand backfill (1'-6')
-6 -8 -10	20 ft							- - -6 - - - -8 - - -			16" dia. air rotary simultaneous casing advancement borehole, (0'-64')
- 12 - 14								- - - 12 - - - - - 14			Bentonite slurry annular seal (6'-50')
- 16 - 18								- - 16 - - - - 18 - -			8" dia. Sch 40, Type 316, stainless steel riser (+2.5'-58')



WELL LOG: 417

Page 2 of 3

DEPTH	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	БЕРТН	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- 20 - - - 22	3 4 7 7	0	12"	1	SILT, SAND & GRAVEL: mod. yellowish brown (10 YR 5/4) to dusky yellow (5 Y 6/4) pred silt, tr clay, some vf-c sand, w/ A- SR gravel, tr. orgnics, dense, stiff, moist		20		
- 22 - -	5 9 8 9	0	16"	2	SILT, SAND & GRAVEL: as above, turning more olive gray (5 Y 4/1) in lower 4", increasing silt and clay, more plastic, moist		22		16" dia. air rotary simultaneous casing advancement borehole, (0'-64')
- 24 - -	6 7 9	0	11"	3	SILT & CLAY: olive gray to It brownish gray (5 YR 6/1) pred silt w/ clay, dense, plastic, with olive black (5 Y 2/1) peat masses and rootlets, large 3" SA rock frag,		— 24 — —		
- 26 - -	8 11 12 12	0	20"	4	SILT & CLAY: as above SILT & CLAY: as above, less peat and greater pred greatish gray (5 GY 6/1) to		— 26 - - -		
- 28 - -	12 13 13	0	24'	5	rootlets, pred greenish gray (5 GY 6/1) to med gray (N5) silt, tr clay, w/ dk yellow orange (10 YR 6/6) mottling, tr f sand, stiff, moist		— 28 —		
- 30 - -	12 6 15 14	0	24"	6	SILT, SAND & GRAVEL: pred silt w/ vf-f sand, tr m-vc, w/ A-SA wthrd siltstone gravel, mottled, dense, moist SILT, SAND & GRAVEL: as above, less		30		Bentonite slurry annular seal (6'-50')
- 32 -	14 9 11 18	0	16"	7	mottled below 14" SILT & GRAVEL: brownish gray (5 YR 4/1) silt, SA-SR fine gravel, tr vf-f sand, dense stiff, moist to wet		32		
- 34 - -	9 10 11 16	0	23"	8	SILT, SAND & GRAVEL: pred. silt , w/ vf-f sand, w/ more SA siltstone frags, some m gravel, pred silt, tr clay lower 3", more homogeneous, dense, stiff, wet		34		
- 36 - -	5 15 16	0	21"	9	SILT, SAND & GRAVEL: as above, pred. silt 15-21", dense, stiff, wet	0.0.7	36 		
- 38 - -	15 7 11 21	0	21"	10	SILT, SAND & GRAVEL: as above, silty 10-14", pred. granules 14-16", v. gravelly elsewhere, some vf-c sand, dense, sl crumbly, wet		38 		
- 40 - -	21 12 17 38	0	20"	11	SILT, SAND & GRAVEL: as above, pred f-m SA-SR clasts of shale and siltstone, v gravelly below 15", dense, stiff, wet	00000	40		8" dia. Sch 40, Type 316, stainless steel riser (+2.5'-58')
- 42 - -	35 37 45 40	0	19"	12	SILT, SAND & GRAVEL: as above w/ more f-m A-SA gravel, dense, wet, turning mod yell brown (10 YR 5/4) lower 8", w/ wthrd clasts, wet	000	-		
44 - -	15 24 26	0	22"	13	SILT, SAND & GRAVEL: dk yell brown to olive gray, sl less silt, w/ vf-vc sand, f-m SA-SR gravel, loose, crumbly, wet		44 - - -		
- 46 - -	28 33 22 42	0	14"	14	SILT, SAND & GRAVEL: as above top 6", then olive gray silt, w/ vf-f sand, tr m-vc, w/ f-m SA-SR gravel, v. dense, stiff, moist		46 - -		

WELL LOG: 417

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DEPTH FEET	BLOW COUNTS	PID (ppm)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH FEET	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
	37				to wet	<u> </u>	-		
48	14 88 Spin casing	0	12"	15	SILT, SAND & GRAVEL: olive gray, silt, some vf-f sand, f-m gravel, v. dense, stiff, moist		48 		Bentonite slurry annular seal (6'-50')
50	PQ Core	0	39"/41"	RUN 1	SHALE: (boulder) med. dark gray (N4) horizontally bedded, some fracturing, irregular top and bottom contacts		- 50 -		Bentonite chip annular seal, (50'-52')
52					SILT, SAND & GRAVEL: olive gray silt with vf-f sand, some m-vc sand, w/ f-m A-SA shale fragments, dense, wet		- 52 -		16" dia. air rotary simultaneous casing
54	PQ Core	0	32"/36"	RUN 2	SILT, SAND & GRAVEL: olive gray silt with vf-f sand, some m-vc sand, w/ f-m A-SA shale fragments, dense, wet		- - - 54 - -		advancement borehole, (0'-64') 8" dia. Sch 40, Type
56	PQ Core	0	20"/24"	RUN 3	SHALE: (boulder) med. dark gray (N4) horizontally bedded, some fracturing, irregular top and bottom contacts		— 56 - -		316, stainless steel riser (+2.5'-58')
58					SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		- 58 - - - - 60		#00N grade sand pack (52'-70')
	PQ Core	0	60"/60"	RUN 4	SHALE: deeply wthrd boulder 60.2' to 61 ft		_		
62					SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		- 62		8" dia. Sch 40, Type 316, 20-slot, stainless steel wire-wrapped screen (58'-64')
					SHALE: fractured shale boulder 61.5 ft to 62.2 ft				
64	PQ Core	0	60"/60"	RUN 5	SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand, some m-vc, w/ A-SA grvl, dense, wet		— 64 - -		8" dia. Sch 40, Type
66					SHALE: med. dk gray (N4), competent, thin horizontal bedding, occ calcite fossil masses 6"-33", calcitic fossil layer 48.5"-49.5", possible clean natural fracture at 8"		- 66 - -	300000000000000000000000000000000000000	316, stainless steel sump (64'-69')
68	Air rotary				SHALE		68 		12" dia. air rotary borehole (64'-70')
70							- 70		

	Loggor		2018 Step-1					
Date and Time	Logger Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
Date and Time	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/4/2018 7:30	16.456	12.39	24.96				0	Pre test
10/4/2018 7:31	16.468	12.39	24.93				0	rie lest
10/4/2018 7:32	16.461	12.34	24.95				0	
10/4/2018 7:33	16.452	12.34	24.93				0	
10/4/2018 7:34	16.464	12.37	24.94				0	
10/4/2018 7:35	16.453	12.36						
10/4/2018 7:36	16.453	12.37	24.97 24.93				0	
10/4/2018 7:37	16.456	12.38	24.96				0	
10/4/2018 7:38	16.45	12.39	24.97				0	
10/4/2018 7:39	16.482	12.38	24.90				0	
10/4/2018 7:40	16.449	12.36	24.97				0	
10/4/2018 7:41	16.462	12.37	24.95				0	
10/4/2018 7:42	16.454	12.40	24.96				0	
10/4/2018 7:43	16.469	12.37	24.93				0	
10/4/2018 7:44	16.469	12.37	24.93				0	C C
10/4/2018 7:45	16.463	12.33	24.94	0		64487.3		Start Step #1
10/4/2018 7:46	15.644	12.37	26.83	1	1.89			Target: 4 gpm
10/4/2018 7:47	15.368	12.38	27.47	2	2.53			
10/4/2018 7:48	15.201	12.40	27.86	3	2.91			
10/4/2018 7:49	15.098	12.41	28.09	4	3.15			
10/4/2018 7:50	15.001	12.40	28.32	5	3.38			
10/4/2018 7:51	14.902	12.42	28.55	6	3.61			
10/4/2018 7:52	14.809	12.44	28.76	7	3.82			
10/4/2018 7:53	14.748	12.43	28.90	8	3.96			
10/4/2018 7:54	14.687	12.39	29.04	9	4.10			
10/4/2018 7:55	14.626	12.38	29.19	10	4.24			
10/4/2018 7:56	14.575	12.38	29.30	11	4.36			
10/4/2018 7:57	14.536	12.39	29.39	12	4.45			
10/4/2018 7:58	14.486	12.39	29.51	13	4.56			
10/4/2018 7:59	14.456	12.37	29.58	14	4.64			
10/4/2018 8:00	14.432	12.39	29.63	15	4.69			
10/4/2018 8:01	14.39	12.40	29.73	16	4.79			
10/4/2018 8:02	14.356	12.40	29.81	17	4.87			
10/4/2018 8:03	14.336	12.39	29.85	18	4.91		<u> </u>	
10/4/2018 8:04	14.313	12.39	29.91	19	4.96		<u> </u>	
10/4/2018 8:05	14.277	12.38	29.99	20	5.05			
10/4/2018 8:06	14.253	12.36	30.05	21	5.10			
10/4/2018 8:07	14.227	12.38	30.11	22	5.16			
10/4/2018 8:08	14.232	12.39	30.09	23	5.15			
10/4/2018 8:09	14.185	12.37	30.20	24	5.26			
10/4/2018 8:10	14.175	12.40	30.23	25	5.28			
10/4/2018 8:11	14.169	12.37	30.24	26	5.30			
10/4/2018 8:12	14.141	12.37	30.30	27	5.36			
10/4/2018 8:13	14.134	12.38	30.32	28	5.38			
10/4/2018 8:14	14.127	12.36	30.34	29	5.40			
10/4/2018 8:15	14.115	12.36	30.36	30	5.42			
10/4/2018 8:16	14.064	12.38	30.48	31	5.54		_	

Data and Time	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Natas
Date and Time	Pressure (PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/4/2018 8:17	14.071	12.35	30.47	32	5.52			
10/4/2018 8:18	14.067	12.38	30.47	33	5.53			
10/4/2018 8:19	14.044	12.34	30.53	34	5.59			
10/4/2018 8:20	14.011	12.35	30.60	35	5.66			
10/4/2018 8:21	14.009	12.35	30.61	36	5.67			
10/4/2018 8:22	13.986	12.37	30.66	37	5.72			
10/4/2018 8:23	13.971	12.35	30.70	38	5.76			
10/4/2018 8:24	13.96	12.36	30.72	39	5.78			
10/4/2018 8:25	13.962	12.36	30.72	40	5.78			
10/4/2018 8:26	13.952	12.34	30.74	41	5.80			
10/4/2018 8:27	13.929	12.35	30.79	42	5.85			
10/4/2018 8:28	13.926	12.38	30.80	43	5.86			
10/4/2018 8:29	13.921	12.37	30.81	44	5.87			
10/4/2018 8:30	13.915	12.36	30.83	45	5.88			
10/4/2018 8:31	13.889	12.38	30.89	46	5.95			
10/4/2018 8:32	13.9	12.37	30.86	47	5.92			
10/4/2018 8:33	13.892	12.39	30.88	48	5.94			
10/4/2018 8:34	13.865	12.37	30.94	49	6.00			
10/4/2018 8:35	13.869	12.35	30.93	50	5.99			
10/4/2018 8:36	13.854	12.36	30.97	51	6.02			
10/4/2018 8:37	13.858	12.35	30.96	52	6.01			
10/4/2018 8:38	13.828	12.36	31.03	53	6.08			
10/4/2018 8:39	13.847	12.37	30.98	54	6.04			
10/4/2018 8:40	13.824	12.35	31.04	55	6.09			
10/4/2018 8:41	13.828	12.35	31.03	56	6.09			
10/4/2018 8:42	13.814	12.34	31.06	57	6.12			
10/4/2018 8:43	13.792	12.37	31.11	58	6.17			
10/4/2018 8:44	13.794	12.37	31.11	59	6.16			
10/4/2018 8:45	13.808	12.37	31.07	60	6.13	64739.5	4.2	Step #2
10/4/2018 8:46	13.26	12.36	32.34	61	7.40			Target: 8 gpm
10/4/2018 8:47	12.887	12.38	33.20	62	8.26			
10/4/2018 8:48	12.59	12.42	33.89	63	8.94			
10/4/2018 8:49	12.332	12.40	34.48	64	9.54			
10/4/2018 8:50	12.106	12.46	35.00	65	10.06			
10/4/2018 8:51	11.936	12.45	35.40	66	10.45			
10/4/2018 8:52	11.789	12.45	35.73	67	10.79			
10/4/2018 8:53	11.682	12.43	35.98	68	11.04			
10/4/2018 8:54	11.56	12.39	36.26	69	11.32			
10/4/2018 8:55	11.486	12.38	36.43	70	11.49			
10/4/2018 8:56	11.384	12.42	36.67	71	11.73			
10/4/2018 8:57	11.314	12.36	36.83	72	11.89			
10/4/2018 8:58	11.26	12.36	36.96	73	12.01			_
10/4/2018 8:59	11.205	12.35	37.08	74	12.14			
10/4/2018 9:00	11.158	12.36	37.19	75	12.25			
10/4/2018 9:01	11.103	12.40	37.32	76	12.38			
10/4/2018 9:02	11.085	12.39	37.36	77	12.42			
10/4/2018 9:03	11.051	12.37	37.44	78	12.50			

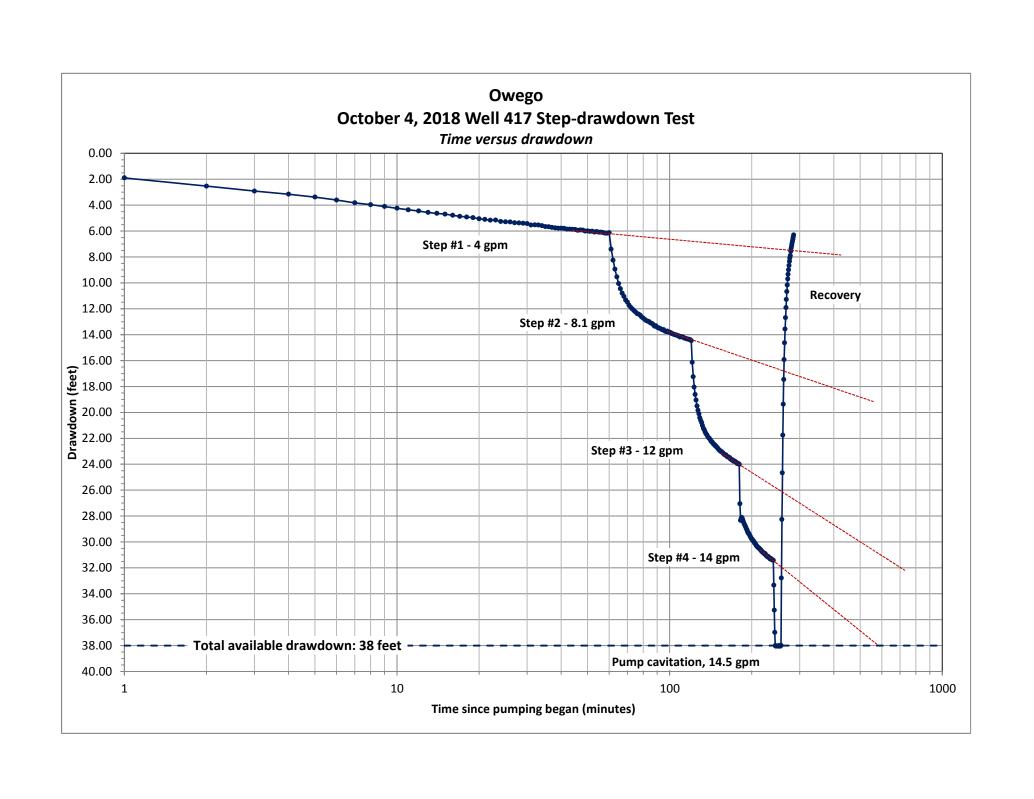
Date and Time		Lagger				n Test				
Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Company Comp	Data and Time	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes	
10/4/2018 9:04 10.992 12.35 37.58 79 12.63	Date and Time		(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes	
10/4/2018 9:05 10.955 12.37 37.66 80 12.72 10/4/2018 9:06 10.909 12.35 37.77 81 12.83 10/4/2018 9:07 10.873 12.34 37.85 82 12.91 10/4/2018 9:08 10.852 12.33 37.90 83 12.96 10/4/2018 9:09 10.836 12.39 37.94 84 12.99 10/4/2018 9:10 10.791 12.36 38.04 85 13.10 10/4/2018 9:11 10.776 12.34 38.07 86 13.13 10/4/2018 9:12 10.739 12.38 38.16 87 13.22 10/4/2018 9:13 10.684 12.36 38.29 88 13.34 10/4/2018 9:14 10.696 12.38 38.26 89 13.32 10/4/2018 9:15 10.648 12.37 38.37 90 13.43 10/4/2018 9:16 10.622 12.36 38.43 91 13.49 10/4/2018 9:17 10.617 12.40 38.44 92 13.50 10/4/2018 9:18 10.588 12.37 38.57 94 13.63 10/4/2018 9:21 10.565 12.40 38.56 95 13.62 10/4/2018 9:21 10.551 12.39 38.66 96 13.72 10/4/2018 9:22 10.502 12.39 38.71 97 13.76 10/4/2018 9:22 10.502 12.39 38.71 97 13.76 10/4/2018 9:25 10.478 12.36 38.79 101 13.85 10/4/2018 9:25 10.478 12.36 38.79 101 13.85 10/4/2018 9:25 10.478 12.36 38.79 101 13.85 10/4/2018 9:25 10.478 12.36 38.79 101 13.85 10/4/2018 9:25 10.478 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.95 105 14.01 10/4/2018 9:33 10.367 12.37 38.99 105 14.01 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:34 10.419 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:34 10.419 12.36 39.04 108 14.09 10/4/2018 9:34 10.419 12.36 39.04 108	10/4/2019 0:04		12.25	27.50	70	12.62				
10/4/2018 9:06 10.909 12.35 37.77 81 12.83 10/4/2018 9:07 10.873 12.34 37.85 82 12.91 10/4/2018 9:08 10.852 12.33 37.90 83 12.96 10/4/2018 9:09 10.836 12.39 37.94 84 12.99 10/4/2018 9:10 10.791 12.36 38.04 85 13.10 10/4/2018 9:11 10.776 12.34 38.07 86 13.13 10/4/2018 9:12 10.739 12.38 38.16 87 13.22 10/4/2018 9:13 10.684 12.36 38.29 88 13.34 10/4/2018 9:14 10.696 12.38 38.26 89 13.32 10/4/2018 9:15 10.648 12.37 38.37 90 13.43 10/4/2018 9:15 10.648 12.37 38.37 90 13.43 10/4/2018 9:16 10.622 12.36 38.43 91 13.49 10/4/2018 9:17 10.617 12.40 38.44 92 13.50 10/4/2018 9:18 10.588 12.37 38.51 93 13.57 10/4/2018 9:19 10.561 12.37 38.57 94 13.63 10/4/2018 9:20 10.565 12.40 38.56 95 13.62 10/4/2018 9:21 10.521 12.39 38.66 96 13.72 10/4/2018 9:22 10.502 12.39 38.71 97 13.76 10/4/2018 9:23 10.519 12.36 38.67 98 13.73 10/4/2018 9:24 10.486 12.38 38.74 99 13.80 10/4/2018 9:25 10.478 12.36 38.76 100 13.82 10/4/2018 9:25 10.478 12.36 38.76 100 13.82 10/4/2018 9:28 10.492 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.37 38.89 103 13.99 10/4/2018 9:29 10.403 12.37 38.89 103 13.99 10/4/2018 9:29 10.403 12.37 38.99 105 14.01 10/4/2018 9:29 10.403 12.37 38.99 105 14.04 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:33 10.367 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.04										
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10/4/2018 9:20 10.565 12.40 38.56 95 13.62 10/4/2018 9:21 10.521 12.39 38.66 96 13.72 10/4/2018 9:22 10.502 12.39 38.71 97 13.76 10/4/2018 9:23 10.519 12.36 38.67 98 13.73 10/4/2018 9:24 10.486 12.38 38.74 99 13.80 10/4/2018 9:25 10.478 12.36 38.76 100 13.82 10/4/2018 9:26 10.467 12.32 38.79 101 13.85 10/4/2018 9:27 10.435 12.37 38.86 102 13.92 10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:18	10.588	12.37	38.51	93	13.57				
10/4/2018 9:21 10.521 12.39 38.66 96 13.72 10/4/2018 9:22 10.502 12.39 38.71 97 13.76 13.76 13.73 10/4/2018 9:23 10.519 12.36 38.67 98 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.73 13.80 13.73 13.80 13.74 13.80 13.80 13.74 13.80 13.74 13.80 13.74 13.80 13.80 13.74 13.80 13.80 13.80 13.72 13.80 13.80 13.80 13.80 13.72 13.80 13.80 13.80 13.80 13.80 13.81 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.80 13.90 13.90 13.90 13.90 <td< td=""><td></td><td></td><td></td><td></td><td>94</td><td></td><td></td><td></td><td></td></td<>					94					
10/4/2018 9:22 10.502 12.39 38.71 97 13.76 10/4/2018 9:23 10.519 12.36 38.67 98 13.73 10/4/2018 9:24 10.486 12.38 38.74 99 13.80 10/4/2018 9:25 10.478 12.36 38.76 100 13.82 10/4/2018 9:25 10.467 12.32 38.79 101 13.85 10/4/2018 9:26 10.467 12.32 38.79 101 13.85 10/4/2018 9:27 10.435 12.37 38.86 102 13.92 10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19 14.19 10/4/2018 9:34 10.319 12.36 39.13 109 14.19 <td>10/4/2018 9:20</td> <td></td> <td></td> <td>38.56</td> <td>95</td> <td></td> <td></td> <td></td> <td></td>	10/4/2018 9:20			38.56	95					
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10/4/2018 9:24 10.486 12.38 38.74 99 13.80 10/4/2018 9:25 10.478 12.36 38.76 100 13.82 10/4/2018 9:26 10.467 12.32 38.79 101 13.85 10/4/2018 9:27 10.435 12.37 38.86 102 13.92 10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:22	10.502	12.39	38.71	97	13.76				
10/4/2018 9:25 10.478 12.36 38.76 100 13.82 10/4/2018 9:26 10.467 12.32 38.79 101 13.85 10/4/2018 9:27 10.435 12.37 38.86 102 13.92 10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:23	10.519	12.36	38.67	98	13.73				
10/4/2018 9:26 10.467 12.32 38.79 101 13.85 10/4/2018 9:27 10.435 12.37 38.86 102 13.92 10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:24	10.486	12.38	38.74	99	13.80				
10/4/2018 9:27 10.435 12.37 38.86 102 13.92 10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:25	10.478	12.36	38.76	100	13.82				
10/4/2018 9:28 10.422 12.37 38.89 103 13.95 10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:26	10.467	12.32	38.79	101	13.85				
10/4/2018 9:29 10.403 12.35 38.94 104 13.99 10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:27	10.435	12.37	38.86	102	13.92				
10/4/2018 9:30 10.397 12.37 38.95 105 14.01 10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:28	10.422	12.37	38.89	103	13.95				
10/4/2018 9:31 10.383 12.37 38.98 106 14.04 10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:29	10.403	12.35	38.94	104	13.99				
10/4/2018 9:32 10.367 12.36 39.02 107 14.08 10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:30	10.397	12.37	38.95	105	14.01				
10/4/2018 9:33 10.36 12.36 39.04 108 14.09 10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:31	10.383	12.37	38.98	106	14.04				
10/4/2018 9:34 10.319 12.36 39.13 109 14.19	10/4/2018 9:32	10.367	12.36	39.02	107	14.08				
	10/4/2018 9:33	10.36	12.36	39.04	108	14.09				
10/4/2018 9:35	10/4/2018 9:34	10.319	12.36	39.13	109	14.19				
, -,	10/4/2018 9:35	10.332	12.41	39.10	110	14.16				
10/4/2018 9:36	10/4/2018 9:36	10.333	12.35	39.10	111	14.16				
10/4/2018 9:37										
10/4/2018 9:38				39.20						
10/4/2018 9:39										
10/4/2018 9:40	10/4/2018 9:40									
10/4/2018 9:41										
10/4/2018 9:42										
10/4/2018 9:43										
10/4/2018 9:44										
10/4/2018 9:45							65207.2	7.8	Step #3	
									Target: 12 gpm	
10/4/2018 9:47 8.997 12.41 42.18 122 17.24									<u> </u>	
10/4/2018 9:48 8.645 12.47 42.99 123 18.05										
10/4/2018 9:49 8.401 12.48 43.56 124 18.61										
10/4/2018 9:50 8.211 12.43 44.00 125 19.05										

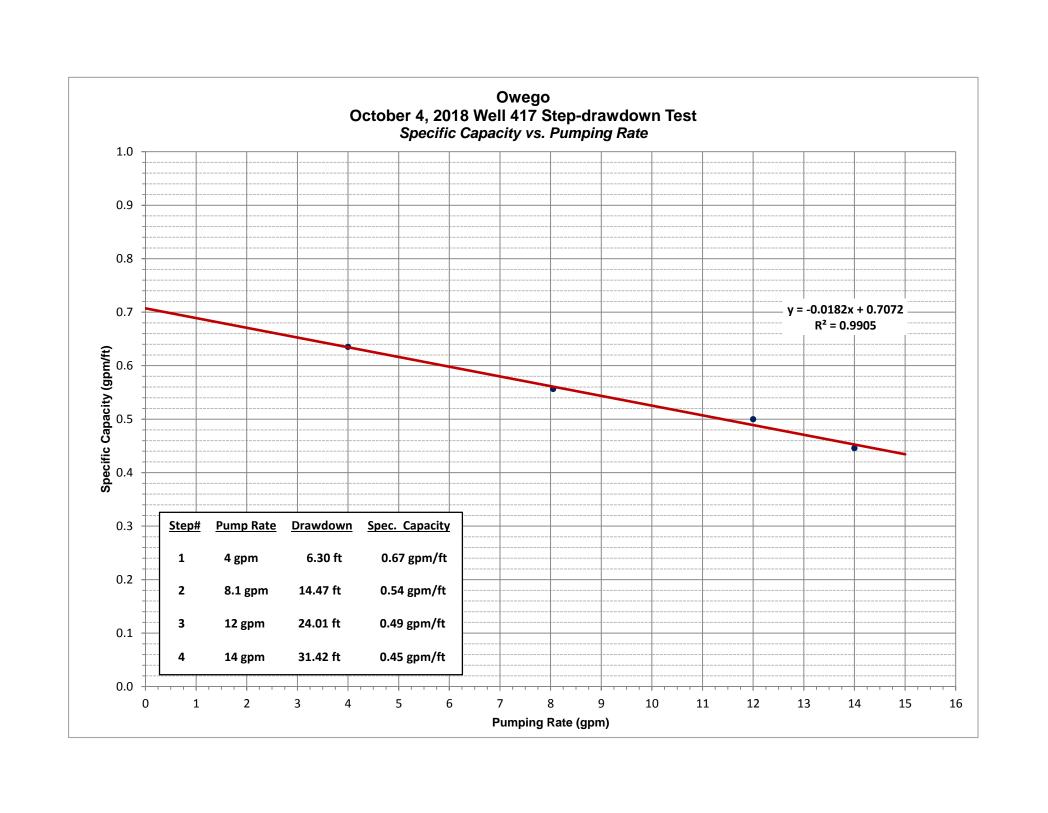
	Laggar	October 4, 2018 Step-Drawdo						
Date and Time	Logger Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
Date and Time	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/4/2018 9:51	8.014	12.48	44.45	126	19.51			
10/4/2018 9:52	7.871	12.48	44.43	127	19.31			
10/4/2018 9:53	7.751	12.46	45.06	128	20.12			
10/4/2018 9:54	7.624	12.48	45.35	129	20.12			
10/4/2018 9:55	7.533	12.43	45.56	130	20.41			
10/4/2018 9:56	7.459	12.43	45.73	131	20.02			
10/4/2018 9:57	7.365	12.42	45.75	132	21.01			
10/4/2018 9:58	7.363	12.42	46.18	133	21.01			
10/4/2018 9:59	7.207	12.39	46.18	134	21.23			
10/4/2018 9.39	7.220	12.42		135	21.52		1	
			46.47					
10/4/2018 10:01	7.093	12.40	46.58	136	21.64			
10/4/2018 10:02	7.047	12.41	46.69	137	21.74			
10/4/2018 10:03	6.992	12.38	46.81	138	21.87			
10/4/2018 10:04	6.951	12.39	46.91	139	21.96			
10/4/2018 10:05	6.93	12.40	46.96	140	22.01			
10/4/2018 10:06	6.886	12.38	47.06	141	22.11			
10/4/2018 10:07	6.835	12.37	47.17	142	22.23			
10/4/2018 10:08	6.815	12.38	47.22	143	22.28			
10/4/2018 10:09	6.776	12.35	47.31	144	22.37			
10/4/2018 10:10	6.738	12.37	47.40	145	22.45			
10/4/2018 10:11	6.725	12.39	47.43	146	22.49			
10/4/2018 10:12	6.682	12.37	47.53	147	22.58			
10/4/2018 10:13	6.675	12.36	47.54	148	22.60			
10/4/2018 10:14	6.632	12.35	47.64	149	22.70			
10/4/2018 10:15	6.61	12.36	47.69	150	22.75			
10/4/2018 10:16	6.569	12.37	47.79	151	22.85			
10/4/2018 10:17	6.538	12.35	47.86	152	22.92			
10/4/2018 10:18	6.524	12.37	47.89	153	22.95			
10/4/2018 10:19	6.499	12.37	47.95	154	23.01			
10/4/2018 10:20	6.49	12.37	47.97	155	23.03			
10/4/2018 10:21	6.464	12.36	48.03	156	23.09			
10/4/2018 10:22	6.439	12.37	48.09	157	23.15			
10/4/2018 10:23	6.418	12.35	48.14	158	23.19			
10/4/2018 10:24	6.389	12.34	48.20	159	23.26			
10/4/2018 10:25	6.372	12.37	48.24	160	23.30			
10/4/2018 10:26	6.378	12.36	48.23	161	23.29			
10/4/2018 10:27	6.341	12.34	48.31	162	23.37			
10/4/2018 10:28	6.315	12.36	48.37	163	23.43			
10/4/2018 10:29	6.308	12.35	48.39	164	23.45			
10/4/2018 10:30	6.299	12.35	48.41	165	23.47			
10/4/2018 10:31	6.287	12.36	48.44	166	23.50			
10/4/2018 10:32	6.252	12.35	48.52	167	23.58			
10/4/2018 10:33	6.236	12.35	48.56	168	23.61			
10/4/2018 10:34	6.214	12.33	48.61	169	23.66			
10/4/2018 10:35	6.214	12.37	48.61	170	23.66			
10/4/2018 10:36	6.182	12.36	48.68	171	23.74			
10/4/2018 10:37	6.172	12.34	48.70	172	23.76			

Date and Time Pressure (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg. C) (deg		Loggor	October 4, 2018 Step-Drawdown 1						
(PSI)	Data and Time	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
10/4/2018 10:38	Date and Time		(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/4/2018 10:39	10/4/2019 10:29		12.24	19.60	172	22.75			
10/4/2018 10:40									
10/4/2018 10:41			<u> </u>						
10/4/2018 10:42 6.091 12.38 48.89 177 23.95									
10/4/2018 10:43									
10/4/2018 10:44 6.084 12.35 48.91 179 23.97 10/4/2018 10:45 6.065 12.34 48.95 180 24.01 65914 11.8 Step #4 10/4/2018 10:46 4.745 12.35 52.00 181 27.06 Target: 14 gpt 10/4/2018 10:47 4.192 12.48 53.28 182 28.33 10/4/2018 10:48 4.255 12.47 53.13 183 28.19 10/4/2018 10:49 4.285 12.44 53.06 184 28.12 10/4/2018 10:50 4.238 12.46 53.17 185 28.23 10/4/2018 10:51 4.173 12.42 53.32 186 28.38 10/4/2018 10:52 4.109 12.37 53.47 187 28.53 10/4/2018 10:53 4.062 12.40 53.58 188 28.63 10/4/2018 10:54 4.019 12.39 53.68 189 28.73 10/4/2018 10:55 3.972 12.39 53.78 190 28.84 10/4/2018 10:55 3.913 12.37 53.92 191									
10/4/2018 10:45 6.065 12.34 48.95 180 24.01 65914 11.8 Step #4 10/4/2018 10:46 4.745 12.35 52.00 181 27.06 Target: 14 gpt 10/4/2018 10:47 4.192 12.48 53.28 182 28.33 10/4/2018 10:48 4.255 12.47 53.13 183 28.19 10/4/2018 10:49 4.285 12.44 53.06 184 28.12 10/4/2018 10:50 4.238 12.46 53.17 185 28.23 10/4/2018 10:51 4.173 12.42 53.32 186 28.38 10/4/2018 10:52 4.109 12.37 53.47 187 28.53 10/4/2018 10:53 4.062 12.40 53.58 188 28.63 10/4/2018 10:54 4.019 12.39 53.68 189 28.73 10/4/2018 10:55 3.972 12.39 53.78 190 28.84 10/4/2018 10:56 3.913 12.37 53.92 191 28.98 10/4/2018 10:57 3.878 12.35 54.00 192 29.06 10/4/2018 10:58 3.826 12.34 54.12 193 29.18 10/4/2018 11:00			1						
10/4/2018 10:46 4.745 12.35 52.00 181 27.06 Target: 14 gpr 10/4/2018 10:47 4.192 12.48 53.28 182 28.33 10/4/2018 10:49 4.285 12.47 53.13 183 28.19 10/4/2018 10:49 4.285 12.44 53.06 184 28.12 10/4/2018 10:50 4.238 12.46 53.17 185 28.23 10/4/2018 10:51 4.173 12.42 53.32 186 28.38 10/4/2018 10:52 4.109 12.37 53.47 187 28.53 10/4/2018 10:53 4.062 12.40 53.58 188 28.63 10/4/2018 10:53 4.062 12.40 53.58 188 28.63 10/4/2018 10:54 4.019 12.39 53.68 189 28.73 10/4/2018 10:55 3.972 12.39 53.68 189 28.73 10/4/2018 10:55 3.913 12.37 53.92 191 28.84 10/4/2018 10:56 3.913 12.37 53.92 191 28.98 10/4/2018 10:57 3.878 12.35							CE014	11.0	C+00 #4
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	10/4/2018 11:04	3.605	12.36	54.63	199	29.69			
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	10/4/2018 11:06	3.553	12.36	54.75	201	29.81			
10/4/2018 11:07 3.518 12.37 54.83 202 29.89	10/4/2018 11:07	3.518	12.37	54.83	202	29.89			
10/4/2018 11:08 3.498 12.36 54.88 203 29.94	10/4/2018 11:08	3.498	12.36	54.88	203	29.94			
10/4/2018 11:09 3.478 12.34 54.93 204 29.98	10/4/2018 11:09	3.478	12.34	54.93	204	29.98			
10/4/2018 11:10 3.432 12.36 55.03 205 30.09	10/4/2018 11:10	3.432	12.36	55.03	205	30.09			
10/4/2018 11:11 3.423 12.34 55.05 206 30.11	10/4/2018 11:11	3.423	12.34	55.05	206	30.11			
10/4/2018 11:12 3.389 12.33 55.13 207 30.19			12.33						
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10/4/2018 11:16 3.294 12.37 55.35 211 30.41									
10/4/2018 11:17 3.267 12.35 55.41 212 30.47									
10/4/2018 11:18 3.263 12.32 55.42 213 30.48									
10/4/2018 11:19 3.235 12.33 55.49 214 30.54									
10/4/2018 11:20 3.216 12.35 55.53 215 30.59									
10/4/2018 11:21 3.206 12.35 55.55 216 30.61									
10/4/2018 11:22 3.169 12.32 55.64 217 30.70									
10/4/2018 11:23 3.147 12.31 55.69 218 30.75									
10/4/2018 11:24 3.139 12.36 55.71 219 30.77									

	1			Jrawdown				
Data and Time	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Nicker
Date and Time	Pressure	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/4/2019 11.25	(PSI) 3.12	12.24	FF 7F	220	20.91			
10/4/2018 11:25		12.34	55.75	220	30.81			
10/4/2018 11:26	3.095	12.32	55.81	221	30.87			
10/4/2018 11:27	3.099	12.34	55.80	222	30.86			
10/4/2018 11:28	3.066	12.33	55.88	223	30.93			
10/4/2018 11:29	3.076	12.34	55.85	224	30.91			
10/4/2018 11:30	3.038	12.33	55.94	225	31.00			
10/4/2018 11:31	3.017	12.33	55.99	226	31.05			
10/4/2018 11:32	3.01	12.34	56.01	227	31.06			
10/4/2018 11:33	2.988	12.34	56.06	228	31.11			
10/4/2018 11:34	2.963	12.30	56.11	229	31.17			
10/4/2018 11:35	2.981	12.32	56.07	230	31.13			
10/4/2018 11:36	2.952	12.29	56.14	231	31.20			
10/4/2018 11:37	2.945	12.34	56.15	232	31.21			
10/4/2018 11:38	2.925	12.34	56.20	233	31.26			
10/4/2018 11:39	2.899	12.34	56.26	234	31.32			
10/4/2018 11:40	2.917	12.32	56.22	235	31.28			
10/4/2018 11:41	2.885	12.34	56.29	236	31.35			
10/4/2018 11:42	2.887	12.33	56.29	237	31.35			
10/4/2018 11:43	2.873	12.32	56.32	238	31.38			
10/4/2018 11:44	2.86	12.34	56.35	239	31.41			
10/4/2018 11:45	2.854	12.31	56.37	240	31.42	66768.3	14.2	Step #5
10/4/2018 11:46	2.023	12.29	58.29	241	33.34			Valve open
10/4/2018 11:47	1.191	12.44	60.20	242	35.26			
10/4/2018 11:48	0.448	12.47	61.92	243	36.98			
10/4/2018 11:49	0.002	12.39	62.95	244	38.01			
10/4/2018 11:50	-0.011	12.39	62.98	245	38.04			
10/4/2018 11:51	-0.009	12.37	62.98	246	38.04			
10/4/2018 11:52	-0.007	12.42	62.97	247	38.03			
10/4/2018 11:53	-0.009	12.39	62.98	248	38.03			
10/4/2018 11:54	-0.015	12.41	62.99	249	38.05			
10/4/2018 11:55	-0.002	12.43	62.96	250	38.02			
10/4/2018 11:56	-0.001	12.42	62.96	251	38.02			
10/4/2018 11:57	-0.021	12.43	63.00	252	38.06			
10/4/2018 11:58	-0.021	12.43	62.96	253	38.02			
10/4/2018 11:59	-0.002	12.42	62.96	254	38.02			14.5 gpm with
10/4/2018 11:39	-0.002	12.47	62.98	255	38.04			Pump Cavitation
10/4/2018 12:01	0.012	12.47	62.93	256	37.99			Start recovery
10/4/2018 12:02	2.265	12.46	57.73	257	32.78			Jean Fectivery
10/4/2018 12:02	4.224	12.41	53.20	257	28.26			
10/4/2018 12:03	5.782			258				
		12.35	49.61		24.66			
10/4/2018 12:05	7.044	12.36	46.69	260	21.75			
10/4/2018 12:06	8.073	12.36	44.32	261	19.37			
10/4/2018 12:07	8.902	12.37	42.40	262	17.46			
10/4/2018 12:08	9.565	12.37	40.87	263	15.93			
10/4/2018 12:09	10.129	12.38	39.57	264	14.63			
10/4/2018 12:10	10.586	12.43	38.51	265	13.57			
10/4/2018 12:11	10.969	12.41	37.63	266	12.69			

Date and Time	Logger Pressure (PSI)	Logger Temp. (deg. C)	Depth to Water (ft)	Test Time (minute)	Drawdown (feet)	Totalizer (gallons)	Ave Flow Rate (gpm)	Notes
10/4/2018 12:12	11.306	12.42	36.85	267	11.91			
10/4/2018 12:13	11.58	12.42	36.22	268	11.27			
10/4/2018 12:14	11.841	12.43	35.61	269	10.67			
10/4/2018 12:15	12.062	12.45	35.10	270	10.16			
10/4/2018 12:16	12.261	12.47	34.65	271	9.70			
10/4/2018 12:17	12.417	12.49	34.28	272	9.34			
10/4/2018 12:18	12.568	12.49	33.94	273	9.00			
10/4/2018 12:19	12.711	12.47	33.61	274	8.66			
10/4/2018 12:20	12.853	12.46	33.28	275	8.34			
10/4/2018 12:21	12.965	12.49	33.02	276	8.08			
10/4/2018 12:22	13.045	12.52	32.83	277	7.89			
10/4/2018 12:23	13.189	12.52	32.50	278	7.56			
10/4/2018 12:24	13.278	12.50	32.30	279	7.36			
10/4/2018 12:25	13.357	12.51	32.12	280	7.17			
10/4/2018 12:26	13.429	12.49	31.95	281	7.01			
10/4/2018 12:27	13.508	12.49	31.77	282	6.82			
10/4/2018 12:28	13.585	12.50	31.59	283	6.65			
10/4/2018 12:29	13.66	12.47	31.41	284	6.47			
10/4/2018 12:30	13.732	12.49	31.25	285	6.31			End of Recovery





APPENDIX K

Extraction Well 418 Design, Installation & Performance Testing Report

Extraction Well 418 Design, Installation & Performance Testing

Introduction

The performance of extraction well 414 in the Parking Lot 001 (P001) Area had been declining for several years and continued to decline during the course of the Remedial Alternatives Investigation (RAI) for the Northern Plume and P001 Area in April 2018. Well 414 was a low yielding, dual-zone extraction well screened from the till/bedrock interface zone up to the base of the alluvial zone. The well was installed in 1990 and replaced extraction well 402, which was installed in 1981. The locations of both wells are shown on **Figure 1**. For the past several years, well 414 experienced intermittent issues associated with a degraded/corroded casing, failing pumps, and fouling. The steel-cased section of the well was stabilized several years ago by relining with a thin fiberglass liner. The lower fiberglass liner apparently failed on August 3, 2018, allowing formation material (rock fragments) to enter and plug well 414. Attempts to remove the well pump using a heavy hoist truck were unsuccessful due to binding of the pump with collapsed formation material.

Well Siting

In anticipation of the need to eventually replace well 414, and with a drilling rig already on-site for the RAI, soil boring 418A was drilled five feet northeast of well 414 in April 2018 near a potential location for a new extraction well to replace well 414. The purpose of soil boring 418A was to generate a detailed well log for installing a replacement well solely in the alluvial zone and fill, and to collect soil samples for sieve analysis and selection of a well screen size. A geologic log for boring 418A is presented in **Attachment A**.

Well Design

Soil samples were collected continuously using split spoon samplers from a depth of 10 feet below ground surface (bgs) to a total depth of 42 feet bgs, the base of the alluvial unit, at which point the boring was backfilled with clean sand to the ground surface. Following gradation analysis of the soil samples (Attachment B), the screen for a new extraction well was designed based on procedures described in Chapter 13, Water Well Design, of the technical reference *Groundwater* and Wells, Second Edition (1986) by F.G. Driscoll. A screen interval from 34 to 39 feet bgs was selected, straddling the target water-bearing zone of 35.5 and 38.4 feet bgs. A 20-slot screen size was selected based on a grain-size analysis of this target zone (see below), which consists of fine-grained formation material, some of which would be removed as the well was developed. The formation material near the top of the selected screen interval is coarser-grained and would be expected to be retained by the finer screen slot size and sand pack.

Using sieve analysis data for the interval from 28 to 40 feet (**Attachment B**), the slot size and grade of pack sand were selected by multiplying the 70% cumulative percent retained size from the gradation curves by a factor of four, and then using the resultant grain size to select a pack sand with a corresponding 70% cumulative percent retained size. As shown in **Attachment B**, the pack sand matching this specification is Morie #00N. The screen slot size was selected based on the 90% cumulative percent retained size of #1 sand (i.e., 20-slot or 0.020-inch). A five-foot sump section was planned below the screen and a solid riser pipe was planned to extend from the top of the screen to approximately two feet above ground surface. A well diameter of eight inches was selected to facilitate placement of the pump equipment and instrumentation.

Well Installation

Replacement extraction well 418 was installed on an accelerated schedule using hollow-stem auger methods in mid-September 2018 following the failure of well 414. The location of well 418 is shown on **Figure 1**.

Installation began on September 18, 2018 using air rotary drilling methods with simultaneous casing advancement. This method advanced the drill casing with a special bit to hold back the formation as the well bore was advanced to its target depth. The boring was slightly over-drilled to a total depth of 45 feet to allow for some formation heave at the bottom of the boring. The stainless steel sump, well screen, and riser pipe were installed at a depth of 44 feet, and the sand pack was emplaced as the drill casing was retracted in stages to allow for a continuous and uniform width to the sand pack surrounding the screened interval. Following development of the sand pack, the annulus between the borehole and the well casing was sealed with bentonite chips and bentonite slurry as the drill casing was retracted up to approximately five feet below grade. The remainder of the borehole was then backfilled with sand to the ground surface to facilitate excavation around the well casing for connection to the buried discharge conveyance line. Installation of well 418 was completed on September 19, 2018 and the well construction log is shown in **Attachment C**.

Well Development

Development of well 418 began on September 26, 2018 by surging and bailing the well. Surging was performed to set the sand pack by removing fines from the sand pack and adjacent formation. Bailing was performed periodically during surging to clean out the well sump as material accumulated during surging and to assess the quantity of sediment entering the well from the formation. After surging and bailing was completed, the well was developed with a submersible pump to continue cleaning fines from the sand pack and to promote optimal flow into the sand pack and well screen from the surrounding aquifer. Well development ceased on September 27, 2018 when the clarity of the pumped water was clear.

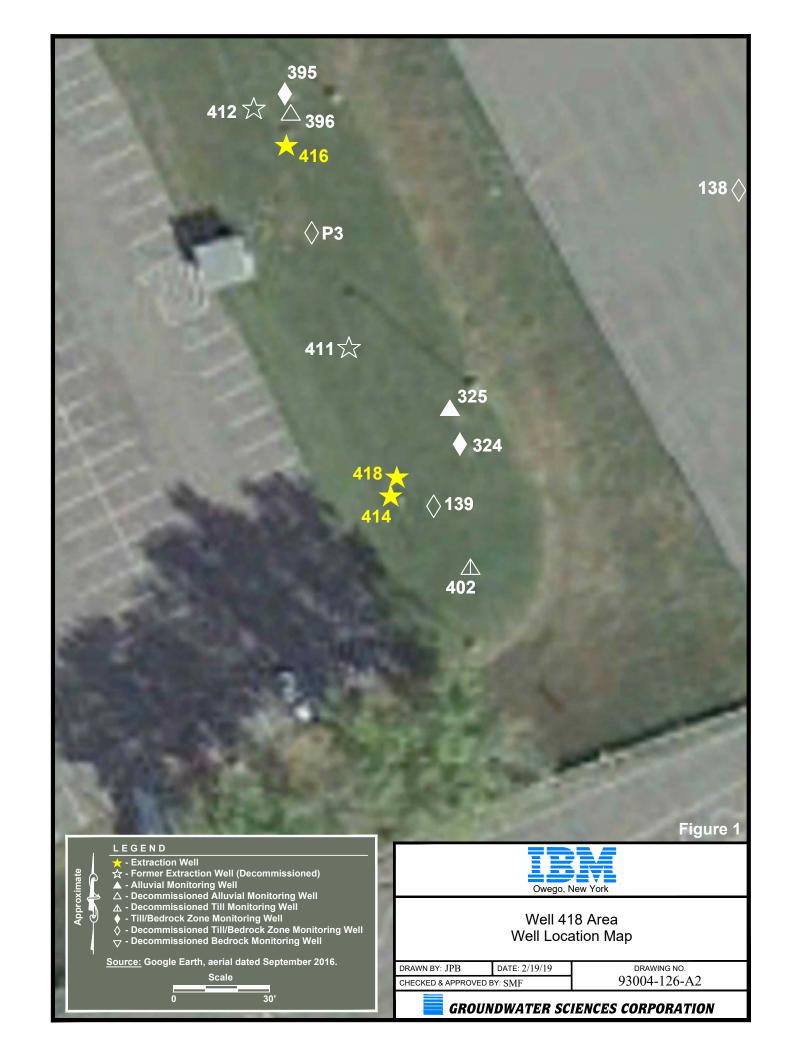
Performance Testing

Following completion of well development, well 418 was pump-tested to assess its performance as an extraction well. This testing was done as a one-day step-drawdown pumping test on October 2, 2018. The test began at a constant pumping rate of one gallon per minute (gpm) for 60 minutes. After 60 minutes, the pumping rate was increased to two gpm for an additional 60 minutes. A total of five 60-minutes steps were attempted at rates of 1, 2, 3, 4 and 5 gpm. Only the 5 gpm step could not be sustained as the water level fell to the level of the pump intake, resulting in cavitation. Pumping continued under cavitation for several minutes with a maximum yield of 4.5 gpm and the pump set at the base of the well screen. The test ended after 278 minutes and recovery was monitored until the water level recovered to within one foot of the pre-test static level.

The data collected during the test was plotted on a graph of drawdown versus time. The data and graph are presented in **Attachment D**. The drawdown graph was used to determine the change in drawdown for each pumping test step, extrapolate the late-time data for each step, and estimate a total drawdown for the long-term pumping test at a given flow rate. A straight line was fitted to the late-time data for each step and the projection of these straight lines was used to determine the trend in drawdown for each pumping rate and whether cavitation would occur at a particular rate. The

goal of the step-test analysis was to select the highest sustainable pumping rate for long-term operation of the well. A rate of 2 to 4 gpm was selected to maximize drawdown in the well without cavitation of a pump set at the base of the screen interval, which is the maximum level of available drawdown.

The step-drawdown test data was also used to calculate the specific capacity of well 418 at various pumping rates and is plotted versus the corresponding discharge rate on the graph of specific capacity in **Attachment D**. The total drawdown at the end of each 60-minute step was determined for each of the first three steps and was used to calculate the specific capacity of the average pumping rate for each step. A straight line was fitted to the test data and the slope of this line was used to estimate the change in the capacity of the well at various discharge rates (e.g., the rate of decrease in the specific capacity as the discharge rate was increased). This specific capacity data will be used as a baseline for future assessments of changes in specific capacity during well rehabilitation activities.





GEOLOGIC LOG: 418A

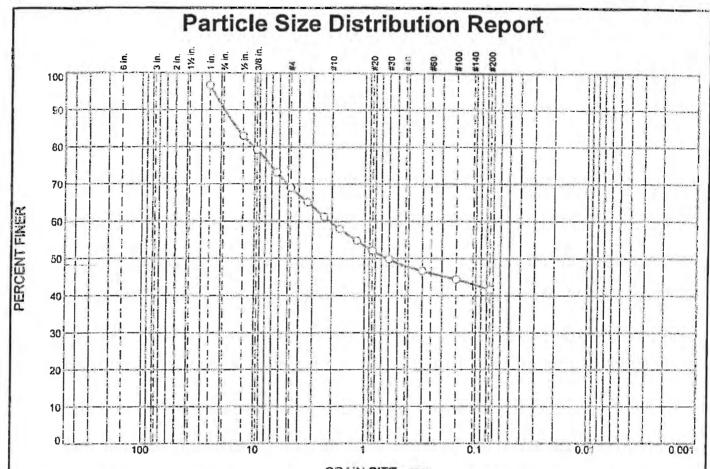
Page 1 of 2

	PROJ	ECT 1	NFO	RMA'	TION	DRILLING INFORMATION							
JOB NO.	CATION: <i>0</i> : 94	1004.46. Fisher	ew York	•		DRILLING CO DRILLER: RIG TYPE: DRILLING M DEVELOPME LOCATION:	ЕТНОІ	W CA D: H ATE: N	Parratt Wolff Inc. W. Rice CME 55 Hollow Stem Auger NA P001 Area, approx. 5 ft NE of well 414				
NOTES	Water enco Pilot boring				below g.s.	SURFACE ELEVATION EASTING NORTHING			891.1 ft amsl 918197.3152 766895.6085				
БЕРТН	BLOW COUNTS	PID (bpm)	RECOV.	SAMP.	SOIL DESCRIPTI	ON	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS			
-0 -2 -4 -6 -8	Augered to 10 ft				TOPSOIL: sod and organic simoist SILT, SAND & GRAVEL: dibrown (10 YR 4/2) silt with vf-m gravel, crumbly, moist	ark yellowish				Top soil backfill, (0 to 0.5')			
- 10 - - - 12	13 8 7 6	0	0"	1	SILT, SAND & GRAVEL: p rock fragment (no recovery)	ushed large		— 10 - - - — 12		8" dia. HSA borehole (0'-41.3')			
- 14	6 6 8 11	0	6"	2	SILT, SAND & GRAVEL: d pred. silt with vf-vc sand mat gravel throughout, crumbly, r	rix, f-m A-SA		- - - 14					
-16	4 3 2 2	0	23"	3	SILT & SAND: olive gray (5 organic silt w/ vf-f sand, tr m-gravel, w/ rootlets and organi cohesive, moist	-vc, tr. f SR		- - - 16					
-18	3 4 3 4	0	21"	4	SILT & SAND: as above, w/ "dia. roots, occ wthrd A-SA s cohesive, moist			- - - 18					
-20	4 6 10 9	0	5"	5	SILT & SAND: as above, lar siltstone frag jammed in tip o			- - - - 20		Sand backfill, (0.5' to 42')			
_	3 3 5 18	0	23"	6	SILT & SAND: as above, sl r gravel in lower 9", w/ rootlets moist	s, cohesive,		- -					
- 22	24	+	_		SILT, SAND & GRAVEL: o	live gray silt	K.	— 22					

GEOLOGIC LOG: 418A

Page 2 of 2

DEPTH FEET	BLOW COUNTS	PID (ppm)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	DEPTH	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- - - 24	21 23 24	0	24"	7	w/ vf-f sand matrix, some m-vc, w/ f-m SA-SR gravel, occ A shale/siltstone frag, crumbly to sl. cohesive, moist		- - - - - 24		
- - - 26	10 15 15 13	0	18"	8	SAND & GRAVEL: dk yell brown, to olive gray, pred m-c, tr silt, lit vf-f, some vc and f SR-R gravel, loose, moist		- - - - - 26		
- - - -28	14 21 22 17	0	13"	9	SILT, SAND & GRAVEL: dk yell brown, silt with vf-f, tr m-vc, SA-SR f gravel, dense, cohesive, moist		28		
- - -	6 7 12 13	0	22"	10	SILT, SAND & GRAVEL: olive gray pred. SR f gravel, tr. A-SA rock wthrd rock frags, dense, sl. crumbly, wet				8" dia. HSA borehole (0'-41.3')
- 30 - -	13 22 29 25	0	23"	11	SILT, SAND & GRAVEL: as above, wet top 8" then more A-SA wthrd shale and siltstone frags, more moderate brown (5 YR 4/4) and moist		30		
- 32 - -	39 33 34 29	0	22"	12	SILT, SAND & GRAVEL: as above, with thin vc and f SR gravel laminations, pred SA shale and siltstone clasts, some SR clasts, cohesive to crumbly, wet		<u>.</u>		
34 	20 24 30 23	0	24"	13	SILT, SAND & GRAVEL: as above, v. gravelly, some layering, freq. SR gravel w/ silty zones, wet		34		Sand backfill, (0.5' to 42')
- 36 - -	Augered				SILT & SAND: mod yellowish brown (10 YR 5/4), layered vf-f sand with silt, wet SAND: c-vc sand, lit f-m, tr f SR-R gravel,		36 - - -		
- 38 - - -	23 40 46 46	0	24"	14	loose, wet SILT, SAND & GRAVEL: mod yell brown, silt with vf-f sans, lit m-vc, w/f SA- SR gravel throughout, pred dusky brown (5		38		
- 40 - - -	13 26 35 69	0	18" 15		Y 2/2) wthrd siltstone frags 8"-14", v. dense, stiff, wet SILT, SAND & GRAVEL: as above top 6", then pred silt w/ vf sand, some color		40		3" dia. split spoon borhole (40' to 42')
42 44					banding, cohesive, wet SILT, SAND & GRAVEL: lt. olive gray (5 Y 5/2) pred silt w/ vf sand matrix, some f-vc, w/ SA-SR f gravel, v. dense, stiff, cohesive, moist		- 42 - - - - - - - 44	_	



GRAIN SIZE - mm % Gravel % Fines % +3" Coarse Fine Coarse Medium Fine SIR Clay 21.4 9.4 11.5 6.4 41.7

1	SIEVE	PERCENT	SPEC.*	PASS?
	SIZE	FINER	PERCENT	(X=NO)
	1.0	96.7		
-	.50	83.0		
1	.375	79.3		
	.25	73.2		
- 1	#4	69.0		
	#6	65.2		
1	#8	61.3		
1	#12	58.0		
1	#16	54.8		
1	#20	52.2		
- 1	#30	49.3		
-	#50	46.7		
- 1	#100	44.5		
	#200	41.7		
1				

Brown Sandy Sill	t And Clay With Som	e Gravei
PL=	Atterberg Limits	Pl=
D ₉₀ = 18.6900 O ₅₀ = 0.6181 D ₁₀ =	Coefficients D85= 14.3980 D30= C _u =	D ₆₀ = 2.0844 D15= C _c =
USCS= GM	Classification AASHT	O= A-4(0)
	Remarks	

(no specification provided)

Source of Sample: Test Boring #418A Sample Number: 1

Depth: 28.0' to 30.0'

Date: 05/18/2018

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owago, New York

Groundwater Sciences Corporation Project #93004

Harrisburg, PA Project No: 18-05-10699 Figure 1

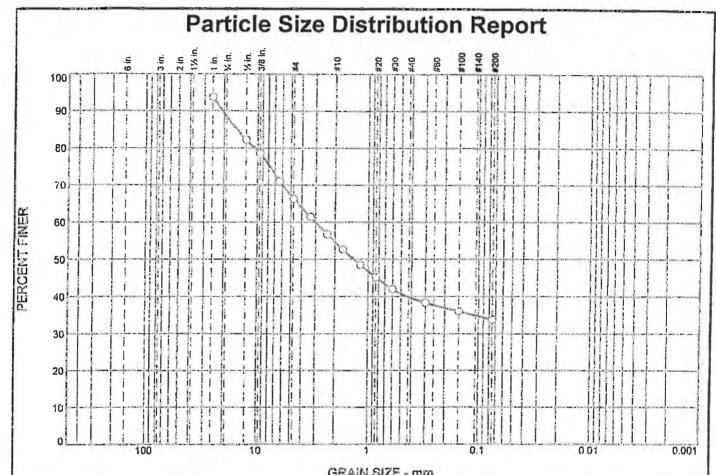


Johnson Filtration Systems Inc.
P.O. Box 64118 • St. Paul, MN 55164-0118
TEL. 612-636-3900 or 1-800-833-9473
TELEX 29-7451 FAX 612-636-0889
SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

SAND ANALYSIS

BY: SMF

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		22.2	11.6	14.8	6.1	33.8			

ſ	SIEVE	PERCENT	SPEC.	PASS?
1	SIZE	FINER	PERCENT	(X=NO)
	1.0	93.8		
-	.50	82.2		
	.375	78.6		
-	.25	71.1		
1	#4	66.3		
	#6	61.4	j i	
	#8	56.8		
١	#12	52.7		
	#16	48.5		
1	#20	45.1		
i	#30	42.1		
	#50	38.3	i	
-	#100	36.0		
	#200	33.8		
		į		

	Material Description	1
Brown Sandy S	ilt And Clay With Some	Gravel
PL=	Atterberg Limits LL=	PI≔
D ₉₀ = 20.6865 D ₅₀ = 1.3505 D ₁₀ =	Coefficients D ₈₅ = 15.4291 D ₃₀ = C _u =	D ₆₀ = 3.0064 D ₁₅ = C _c =
USCS= GM	Classification AASHTO	= A-2-4(0)
	Remarks	

Source of Sample: Test Boring #418A Sample Number: 2 Depth: 30.0' to 30.75'

Date: 05/18/2018

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owego, New York

Groundwater Sciences Corporation Project #93004

Harrisburg, PA

Project No: 18-05-10699

Figure

10

⁽no specification provided)

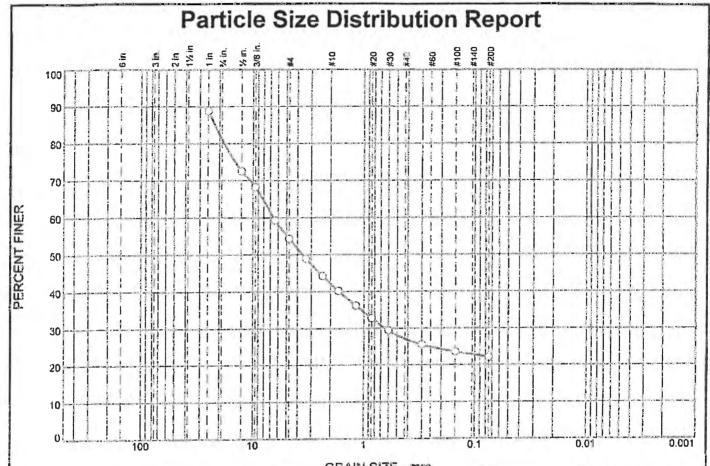


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SEND SAMPLES TO: 1950 OLD HWY 8, NEW BRIGHTON, MN 55112

SAND ANALYSIS

BY:

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		26.9	12.1	15.1	5.0	22.1	

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	SIZE	FINER	PERCENT	(X=NO)
	1.0	83.8		
	.50	72.6		
1	.375	68.3		
1	.25	59.3		
	#4	54.3		
	#6	49.0		
1	#8	44.3		
	#12	40.2		
	#16	36.2		
ļ	#20	32.8	1	
	#30	29.5		
	#50	25.5		
	#100	23.5		
	#200	22.1		

Brown Gravely S	Sand With Some Silt A	And Clay
PL=	Atterberg Limits	PI=
D ₉₀ = D ₅₀ = 3.5905 D ₁₀ =	Coafficients D ₈₅ = 22.0498 D ₃₀ = 0.6371 C _u =	D ₆₀ = 6.5555 D ₁₅ = C _c =
USCS= GM		O= A-I-b
	Remarks	

Source of Sample: Test Boring #418A Sample Number: 3

Depth: 30.75' to 32.0'

Date: 05/18/2018

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owego, New York

Groundwater Sciences Corporation Project #93004

Harrisburg, PA Proje

Project No: 18-05-10699

Figure_

3

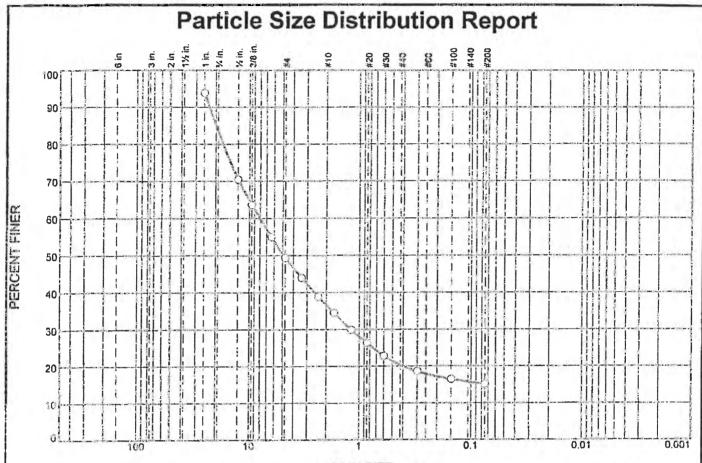
⁽no specification provided)



SAND ANALYSIS (COARSE)

MAILING ADDRESS: P.O. BOX 43118 ST. PAUL, MINNESOTA # 55164

			Zip Date
Remarks:	Test Boring 418A,	30.75 - 32 ft Inter.	4
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GRAIN SIZE - mm % Fines % Sand % Gravel % +3" Fine Silt Clay Medium Coarse Fine Coarse 15.1 5.2 33.9 12.8 16.3

	PERCENT	SPEC."	PASS?
SIZE	FINER	PERCENT	(X=NO)
1.0	93.9		
.50	70.5		
.375	63.7		
.25	55.0		
#4	49.4		
#6	44.0		
#8	38.8		
#12	34.5		
#16	29.9		
#20	26.3		
#30	22.9		
#50	18.6		
#100	16.5		
#200	15.1		

	flaterial Description Gravel With Little Signature	77
PL=	Atterberg Limits	PI=
D ₉₀ = 22.8997 D ₅₀ = 4.9032 D ₁₀ =	Coefficients D85= 19.9796 D30= 1.1871 Cu=	D ₆₀ = 8.0403 D ₁₅ = C _c =
USCS= GM	Classification AASHT0)= A-1-a
	Remarks	

(no specification provided)

Source of Sample: Test Boring #418A Sample Number: 4 Depth: 32.0' to 34.0'

Date: 05/18/2018

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owego, New York

Groundwater Sciences Corporation Project #93004

Project No: 18-05-10699

Figure

4

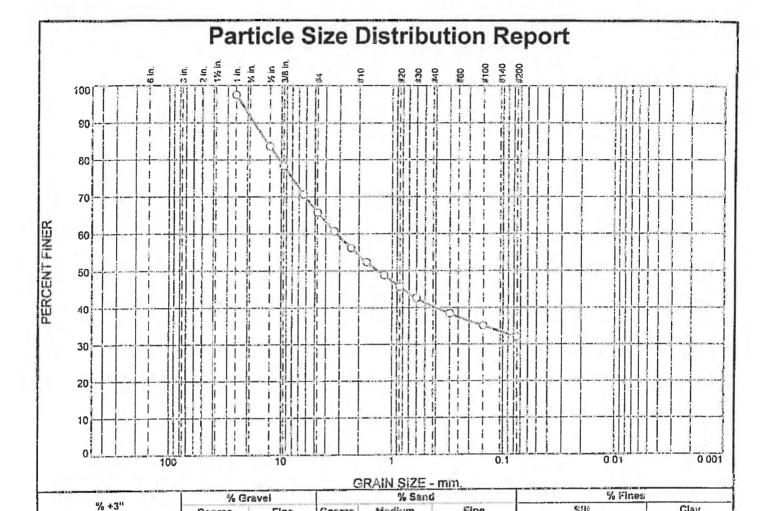
Harrisburg, PA



SAND ANALYSIS (COARSE) MAILING ADDRESS: P.O. BOX 43118

ST. PAUL, MINNESOTA . 55164

SERVE SIEVE CHENING CUMULATIVE'S RETAINED Notes: Coarse interval 20% silt/clay NO INCHES MM. 14 250 6.35 45 4 .187 4.76 50.6 6 .132 3.36 56 8 .094 2.38 6/.2 Recommended Slot Opening. 12 066 1.68 65.5 16 0.47 1.19 70.1 20 0.53 0.84 73.7 30 .023 0.60 77.1 40 0.16 0.72 79.0 Fecommended Screen: Dia. in Length Ft 50 .008 0.21 83.5	From well of			The Park Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of the Control of t	S	tate/	UY	Zip _		Oate		
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Medium

13.8

SIEVE	PERCENT	SPEC."	PASS?
SIZE	FINER	PERCENT	(X=NO)
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.50	83.7		
.375	78.4		
.25	70.7		
#4	65.8		
#6	60.7		
#8	56.2		
#12	52.3		
#16	48.8		
#20	45.7		
#30	42.7		
#50	38.5		
#100	35.1		
#200	32.1		

Coarse

Fine

25.8

Coarse

11.6

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D ₉₀ = 17.5976 D ₅₀ = 1.3395 D ₁₀ =	Coefficients D85= 13.6357 D30= Cu=	D ₆₀ = 3.1754 D ₁₅ = C _c =
USCS= GM	Classification AASHTO)= A-2-4(0)
	Remarks	

Fine

8.3

Silt

32.1

(no specification provided)

Source of Sample: Test Boring #418A Sample Number: 5

Depth: 34.0' to 36.0'

Date: 05/18/2018

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owego, New York

Groundwater Sciences Corporation Project #93004

Project No: 18-05-10699

Figure

Clay

Harrisburg, PA

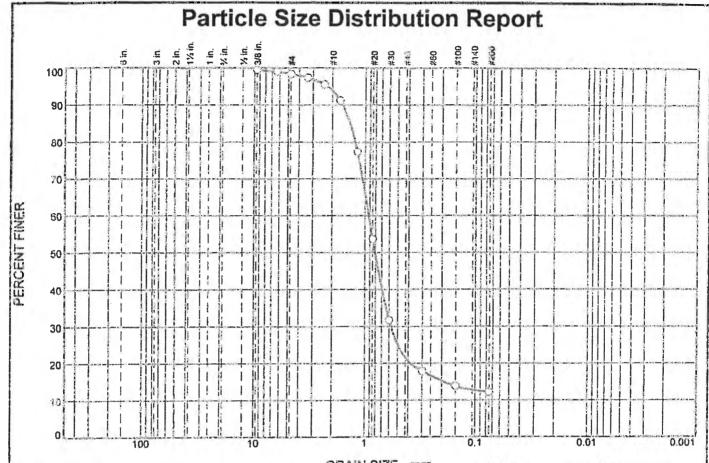


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SAND ANALYSIS

BY:

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	100	.00		0.15	64.9											
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% +3"	Coarse	Fine	Coarse	Madium	Fine	Silt	Clay
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SIEVE	PERCENT	SPEC."	PASS?
SIZE	FINER	PERCENT	(X=NO)
.375	99.4		
.25	99.0		
#4	98.4		
#6	97.4		
#8	95.6		
#12	91.2		
#16	77.4		
#20	53.7		
#30	31.8		
#50	17.9		
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USCS= SM	Classification AASHT Remarks	O= A-1-b

(no specification provided)

Source of Sample: Test Boring #418A Sample Number: 6 Dapth: 38.0' to 38.4'

Date: 05/18/2018

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owego, New York

Groundwater Sciences Corporation Project #93004

Harrisburg, PA Project No: 18-05-10699

Figure

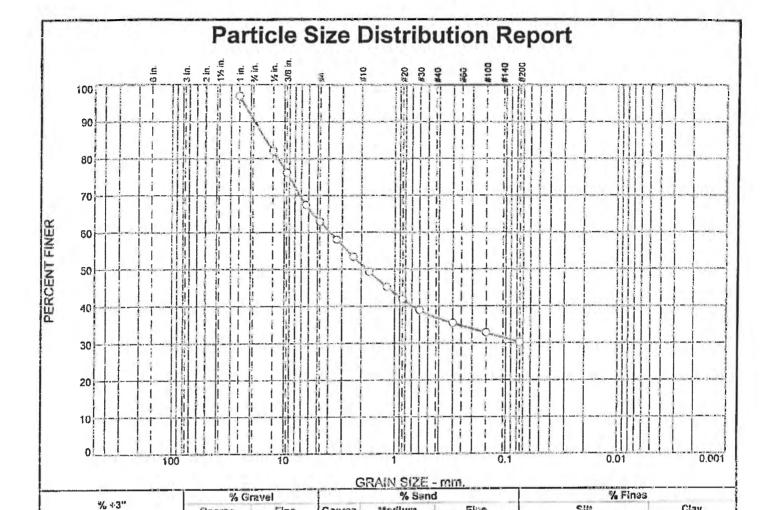
6



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SIEVE	PERCENT	SPEC."	PASS7
SIZE	FINER	PERCENT	(X=NO)
1.0	96.9		
.50	82.1		
.375	76.2		
.25	67.4		
#4	63.0		
#6	58.1		
#8	53.3		
#12	49.3		
#16	45.2		
#20	41.9		
#30	39.0		
#50	35.4		
#100	32.9		
#200	30.3		

Coarse

Fine

27.6

Coarse

11.8

Medium

14.3

<u>N</u>	laterial Descriptio	<u>n</u>
Brown Gravely S	and With Some Silt A	And Clay
, may t	Atterberg Limits	PI=
PL=	LL=	PI=
D 10 5200	Coefficients Da5= 14.6555	₽ ₆₀ = 3.8413
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	Classification	
USCS= GM	AASHTO	O=A-2-4(0)
	Remarks	

Sile

30.3

Flire

6.6

(no specification provided)

Source of Sample: Test Boring #418A Sample Number: 7

Depth: 38.4' to 40.0'

Date: 05/18/2018

Clay

F. T. Kitlinski & Associates, Inc.

Client: Groundwater Sciences Corporation

Project: IBM Owego, New York

Groundwater Sciences Corporation Project #93004

Harrisburg, PA Project No: 18-05-10699

7 **Figure**



SAND ANALYSIS (COARSE)

MAILING ADDRESS: P.O. BOX 43118 ST. PAUL, MINNESOTA № 65164

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4	.250 .187	6.35 4.76	32.6 37.0								are entered a depart	Carriero de la como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de como de		entrantina per pennaga e	***************************************				
6 8 12 16	.132 .094 .066 .047	3,36 2,38 1,68 1,19	41.9 46.7 50.7 54.8				Recon	nmend			ening:	A. 100/4" A. 100 - 100		****					
20 30	.033	0.84	58.1 61.0 63.0				Recon	nmend	ed Sci	reen; l	Dia.		. <u></u> i	n. Lei	natix		and water to the sale	Ft	
40	.0/2	. 30	64.6												- -				



WELL LOG: 418

Page 1 of 2

PROJECT INFORMATION					ΓΙΟΝ	DRILLING INFORMATION								
JOB NO.	CATION: <i>O</i> 1	wego, No 2004.46.1 Fisher	ew York 1701	Facility		DRILLING CO.: Eichelbergers, Inc. DRILLER: C. Knaub RIG TYPE: Ingersoll Rand T4 DRILLING METHOD: Air Rotary DEVELOPMENT DATE: 9/26/18 - 9/27/18 LOCATION: P001 Area, approx. 5 ft NE of former well 414								
NOTES	SWL=23.50 WL Measur	ft belo	w TOC,	10/2/18		SURFACE EL EASTING NORTHING	EVATI	9	91.0 ft amsl 18198.98 66895.69	98.98				
DEPTH	BLOW COUNTS	PID (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	ON	GRAPHIC	DEPTH FEET	WEI		WELL CONSTRUCTION DETAILS			
- 2								- 2 			8" locking well cap			
-0 -					TOPSOIL: sod and organic si	lt and sand,	\$\$. \(\frac{1}{2}\):	- 0 -	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Topsoil backfill (0'-1')			
-2 -2					SILT, SAND & GRAVEL: da brown (10 YR 4/2) silt with v f-m gravel, crumbly, moist	ark yellowish f-vc sand, and		- 2 -			Sand backfill (1'-6')			
-4 -6 8	Augered to 10 ft							- -4 - - - -6 - - - -8 -			16" dia. air rotary simultaneous casing advancement borehole (0'-45.5')			
- 10 - - - 12	13 8 7 6	0	0"	1	SILT, SAND & GRAVEL: pt rock fragment (no recovery)	ished large		— 10 - - - — 12			Bentonite slurry			
-	6 6 8 11	0	6"	2	SILT, SAND & GRAVEL: dl pred. silt with vf-vc sand mate gravel throughout, crumbly, n	rix, f-m A-SA		- - -			annular seal (6'-25')			
- 14 16	4 3 2 2	0	23"	3	SILT & SAND: olive gray (5 organic silt w/ vf-f sand, tr m-gravel, w/ rootlets and organic cohesive, moist	vc, tr. f SR		— 14 - - - — 16						
-	3 4 3 4	0	21"	4	SILT & SAND: as above, w/ "dia. roots, occ wthrd A-SA s cohesive, moist			- - -			8" dia. Sch 40, Type 316, stainless steel			
- 18	4 6 10	0	5"	5	SILT & SAND: as above, larg siltstone frag jammed in tip of			— 18 - -			riser (+2.5'-34')			



GROUNDWATER SCIENCES CORPORATION

WELL LOG: 418

Page 2 of 2

DEPTH FEET	BLOW COUNTS	Olld (mdd)	RECOV.	SAMP.	SOIL DESCRIPTION	GRAPHIC	БЕРТН	WELL CONSTRUCTION	WELL CONSTRUCTION DETAILS
- 20 -	9 3 3 5	0	23"	6	SILT & SAND: as above, sl more fine SR gravel in lower 9", w/ rootlets, cohesive, moist		- 20 - -		16" dia. air rotary simultaneous casing advancement borehole (0'-45.5')
- 22 - - - - 24	18 24 21 23 24	0	24"	7	SILT, SAND & GRAVEL: olive gray silt w/ vf-f sand matrix, some m-vc, w/ f-m SA-SR gravel, occ A shale/siltstone frag, crumbly to sl. cohesive, moist		22 24		Bentonite slurry annular seal (6'-25')
- - - 26	10 15 15 13	0	18"	8	SAND & GRAVEL: dk yell brown, to olive gray, pred m-c, tr silt, lit vf-f, some vc and f SR-R gravel, loose, moist		— — — 26		Bentonite chip annular
- - - 28	21 22 17	0	13"	9	SILT, SAND & GRAVEL: dk yell brown, silt with vf-f, tr m-vc, SA-SR f gravel, dense, cohesive, moist		- - - - 28		seal, (25'-30')
- - -	6 7 12 13	0	22"	10	SILT, SAND & GRAVEL: olive gray pred. SR f gravel, tr. A-SA rock wthrd rock frags, dense, sl. crumbly, wet		_ _ _		8" dia. Sch 40, Type 316, stainless steel
- 30 - - - - 32	13 22 29 25	0	23"	11	SILT, SAND & GRAVEL: as above, wet top 8" then more A-SA wthrd shale and siltstone frags, more moderate brown (5 YR 4/4) and moist		- 30 - - - - - 32		riser (+2.5'-34')
- 32 - - - 34	39 33 34 29	0	22"	12	SILT, SAND & GRAVEL: as above, with thin vc and f SR gravel laminations, pred SA shale and siltstone clasts, some SR clasts, cohesive to crumbly, wet		- 32 34		#00N grade sand pack (30'-44')
- 3 4 - -	20 24 30 23	0	24"	13	SILT, SAND & GRAVEL: as above, v. gravelly, some layering, freq. SR gravel w/ silty zones, wet		- 3 4		
- 36 - -	Augered				SILT & SAND: mod yellowish brown (10 YR 5/4), layered vf-f sand with silt, wet		36 		8" dia. Sch 40, Type 316, 20-slot, stainless steel wire-wrapped screen (34'-39')
- 38 - -	23 40 46	0	24"	14	SAND: c-vc sand, lit f-m, tr f SR-R gravel, loose, wet SILT, SAND & GRAVEL: mod yell brown, silt with vf-f sans, lit m-vc, w/ f SA-SR gravel throughout, pred dusky brown (5)		38 		selecti (34 37)
- 40 - -	13 26 35 69	0	18"	15	Y 2/2) whird siltstone frags 8"-14", v. dense, stiff, wet SILT, SAND & GRAVEL: as above top 6", then pred silt w/ vf sand, some color banding, cohesive, wet		-		8" dia. Sch 40, Type 316, stainless steel
42 44 	Air rotary				SILT, SAND & GRAVEL: lt. olive gray (5 Y 5/2) pred silt w/ vf sand matrix, some fvc, w/ SA-SR f gravel, v. dense, stiff, cohesive, moist SILT, SAND & GRAVEL: as above	0000000			#00N grade sand backfill (44'-45.5')
- 46						() -	_ 46		

Date and Time	Logger Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	
10/2/2018 7:50	8.02	12.23	23.55				0	Pre test
10/2/2018 7:51	8.02	12.20	23.55				0	
10/2/2018 7:52	8.02	12.21	23.55				0	
10/2/2018 7:53	8.02	12.21	23.56				0	
10/2/2018 7:54	8.03	12.22	23.54				0	
10/2/2018 7:55	8.00	12.22	23.59				0	
10/2/2018 7:56	8.01	12.23	23.58				0	
10/2/2018 7:57	8.02	12.19	23.55				0	
10/2/2018 7:58	8.03	12.23	23.53				0	
10/2/2018 7:59	8.01	12.20	23.56				0	
10/2/2018 8:00	8.03	12.21	23.53	0	0.00	61597.2		Start Step #1
10/2/2018 8:01	7.35	12.23	25.10	1	1.57			Target: 1 gpm
10/2/2018 8:02	7.33	12.24	25.15	2	1.62			
10/2/2018 8:03	7.40	12.22	24.99	3	1.46			
10/2/2018 8:04	7.43	12.22	24.91	4	1.37			
10/2/2018 8:05	7.44	12.21	24.89	5	1.36			
10/2/2018 8:06	7.44	12.21	24.88	6	1.35			
10/2/2018 8:07	7.44	12.21	24.88	7	1.35			
10/2/2018 8:08	7.47	12.24	24.82	8	1.29			
10/2/2018 8:09	7.45	12.23	24.86	9	1.33			
10/2/2018 8:10	7.45	12.22	24.87	10	1.33			
10/2/2018 8:11	7.44	12.20	24.88	11	1.35			
10/2/2018 8:12	7.43	12.20	24.92	12	1.39			
10/2/2018 8:13	7.43	12.18	24.90	13	1.37			
10/2/2018 8:14	7.44	12.24	24.89	14	1.35			
10/2/2018 8:15	7.43	12.22	24.91	15	1.38			
10/2/2018 8:16	7.41	12.22	24.97	16	1.44			
10/2/2018 8:17	7.41	12.21	24.96	17	1.43			
10/2/2018 8:18	7.41	12.22	24.96	18	1.43			
10/2/2018 8:19	7.39	12.19	25.00	19	1.47			
10/2/2018 8:20	7.39	12.24	25.01	20	1.48			
10/2/2018 8:21	7.41	12.23	24.96	21	1.42			
10/2/2018 8:22	7.40	12.19	24.99	22	1.46			
10/2/2018 8:23	7.40	12.20	24.98	23	1.45			
10/2/2018 8:24	7.40	12.25	24.99	24	1.45			
10/2/2018 8:25	7.39	12.23	25.02	25	1.48			
10/2/2018 8:26	7.39	12.22	25.01	26	1.48			
10/2/2018 8:27	7.40	12.21	24.99	27	1.46			
10/2/2018 8:28	7.40	12.21	24.99	28	1.46			
10/2/2018 8:29	7.40	12.23	24.99	29	1.46			
10/2/2018 8:30	7.36	12.23	25.08	30	1.55			
10/2/2018 8:31	7.38	12.21	25.03	31	1.50			
10/2/2018 8:32	7.38	12.21	25.02	32	1.49			
10/2/2018 8:33	7.38	12.20	25.03	33	1.49			
10/2/2018 8:34	7.36	12.21	25.09	34	1.55			
10/2/2018 8:35	7.36	12.22	25.07	35	1.54			
10/2/2018 8:36	7.37	12.21	25.05	36	1.52			

	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	
Date and Time	Pressure (PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/2/2018 8:37	7.37	12.21	25.05	37	1.51			
10/2/2018 8:38	7.36	12.22	25.08	38	1.54			
10/2/2018 8:39	7.37	12.19	25.04	39	1.51			
10/2/2018 8:40	7.37	12.20	25.05	40	1.52			
10/2/2018 8:41	7.37	12.21	25.05	41	1.52			
10/2/2018 8:42	7.38	12.21	25.04	42	1.50			
10/2/2018 8:43	7.35	12.23	25.09	43	1.56			
10/2/2018 8:44	7.37	12.22	25.05	44	1.52			
10/2/2018 8:45	7.35	12.20	25.10	45	1.57			
10/2/2018 8:46	7.35	12.21	25.10	46	1.57			
10/2/2018 8:47	7.36	12.22	25.08	47	1.55			
10/2/2018 8:48	7.36	12.21	25.09	48	1.55			
10/2/2018 8:49	7.36	12.22	25.08	49	1.55			
10/2/2018 8:50	7.36	12.20	25.07	50	1.54			
10/2/2018 8:51	7.34	12.22	25.11	51	1.58			
10/2/2018 8:52	7.35	12.20	25.09	52	1.56			
10/2/2018 8:53	7.35	12.23	25.09	53	1.56			
10/2/2018 8:54	7.33	12.20	25.13	54	1.60			
10/2/2018 8:55	7.36	12.21	25.08	55	1.55			
10/2/2018 8:56	7.35	12.24	25.10	56	1.57			
10/2/2018 8:57	7.33	12.23	25.14	57	1.61			
10/2/2018 8:58	7.32	12.21	25.16	58	1.63			
10/2/2018 8:59	7.33	12.22	25.15	59	1.62			
10/2/2018 9:00	7.31	12.22	25.18	60	1.65	61669	1.20	Step #2
10/2/2018 9:01	6.92	12.23	26.09	61	2.56			Target: 2 gpm
10/2/2018 9:02	6.89	12.23	26.16	62	2.63			
10/2/2018 9:03	6.87	12.21	26.21	63	2.68			
10/2/2018 9:04	6.86	12.25	26.23	64	2.70			
10/2/2018 9:05	6.82	12.22	26.33	65	2.80			
10/2/2018 9:06	6.81	12.19	26.35	66	2.82			
10/2/2018 9:07	6.78	12.23	26.43	67	2.89			
10/2/2018 9:08	6.77	12.23	26.45	68	2.91			
10/2/2018 9:09	6.72	12.23	26.55	69	3.02			
10/2/2018 9:10	6.73	12.21	26.53	70	3.00			
10/2/2018 9:11	6.71	12.22	26.57	71	3.04			
10/2/2018 9:12	6.70	12.22	26.61	72	3.07			
10/2/2018 9:13	6.68	12.20	26.66	73	3.12			
10/2/2018 9:14	6.68	12.25	26.65	74	3.12			
10/2/2018 9:15	6.66	12.22	26.69	75	3.16			
10/2/2018 9:16	6.64	12.19	26.74	76	3.20			
10/2/2018 9:17	6.62	12.24	26.78	77	3.25			
10/2/2018 9:18	6.62	12.19	26.79	78	3.26			
10/2/2018 9:19	6.61	12.23	26.82	79	3.28			
10/2/2018 9:20	6.62	12.23	26.79	80	3.26			
10/2/2018 9:21	6.59	12.20	26.84	81	3.31			
10/2/2018 9:22	6.58	12.18	26.87	82	3.33			
10/2/2018 9:23	6.60	12.24	26.84	83	3.31			

	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	
Date and Time	Pressure	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/0/001000	(PSI)			` '	, ,		.0. /	
10/2/2018 9:24	6.58	12.22	26.87	84	3.34			
10/2/2018 9:25	6.58	12.19	26.89	85	3.36			
10/2/2018 9:26	6.57	12.23	26.89	86	3.36			
10/2/2018 9:27	6.56	12.20	26.92	87	3.39			
10/2/2018 9:28	6.57	12.20	26.90	88	3.37			
10/2/2018 9:29	6.55	12.18	26.95	89	3.42			
10/2/2018 9:30	6.55	12.19	26.95	90	3.42			
10/2/2018 9:31	6.55	12.21	26.95	91	3.41			
10/2/2018 9:32	6.53	12.19	26.99	92	3.46			
10/2/2018 9:33	6.54	12.20	26.96	93	3.43			
10/2/2018 9:34	6.54	12.20	26.96	94	3.43			
10/2/2018 9:35	6.52	12.22	27.02	95	3.49			
10/2/2018 9:36	6.53	12.23	27.00	96	3.47			
10/2/2018 9:37	6.52	12.23	27.01	97	3.48			
10/2/2018 9:38	6.51	12.22	27.04	98	3.51			
10/2/2018 9:39	6.51	12.19	27.03	99	3.50			
10/2/2018 9:40	6.52	12.22	27.02	100	3.49			
10/2/2018 9:41	6.50	12.21	27.05	101	3.52			
10/2/2018 9:42	6.48	12.24	27.11	102	3.58			
10/2/2018 9:43	6.50	12.22	27.07	103	3.54			
10/2/2018 9:44	6.50	12.20	27.06	104	3.53			
10/2/2018 9:45	6.49	12.22	27.10	105	3.56			
10/2/2018 9:46	6.49	12.22	27.08	106	3.55			
10/2/2018 9:47	6.50	12.20	27.07	107	3.54			
10/2/2018 9:48	6.50	12.20	27.07	108	3.54			
10/2/2018 9:49	6.49	12.22	27.10	109	3.56			
10/2/2018 9:50	6.50	12.19	27.07	110	3.54			
10/2/2018 9:51	6.48	12.21	27.11	111	3.58			
10/2/2018 9:52	6.49	12.20	27.08	112	3.55			
10/2/2018 9:53	6.49	12.18	27.08	113	3.55			
10/2/2018 9:54	6.47	12.24	27.13	114	3.60			
10/2/2018 9:55	6.47	12.21	27.14	115	3.61			
10/2/2018 9:56	6.46	12.21	27.15	116	3.62			
10/2/2018 9:57	6.47	12.20	27.13	117	3.60			
10/2/2018 9:58	6.47	12.20	27.13	118	3.60			
10/2/2018 9:59	6.46	12.23	27.15	119	3.62			
10/2/2018 10:00	6.47	12.19	27.14	120	3.61	61783.3	1.91	Step #3
10/2/2018 10:01	6.21	12.20	27.73	121	4.19			Target: 3 gpm
10/2/2018 10:02	5.95	12.22	28.32	122	4.79	-		
10/2/2018 10:03	5.89	12.21	28.46	123	4.93			
10/2/2018 10:04	5.86	12.19	28.55	124	5.02			
10/2/2018 10:05	5.82	12.19	28.63	125	5.10			
10/2/2018 10:06	5.79	12.24	28.70	126	5.17			
10/2/2018 10:07	5.76	12.24	28.78	127	5.24			
10/2/2018 10:08	5.74	12.22	28.81	128	5.28			
10/2/2018 10:09	5.70	12.23	28.90	129	5.37			
10/2/2018 10:10	5.70	12.22	28.90	130	5.37			

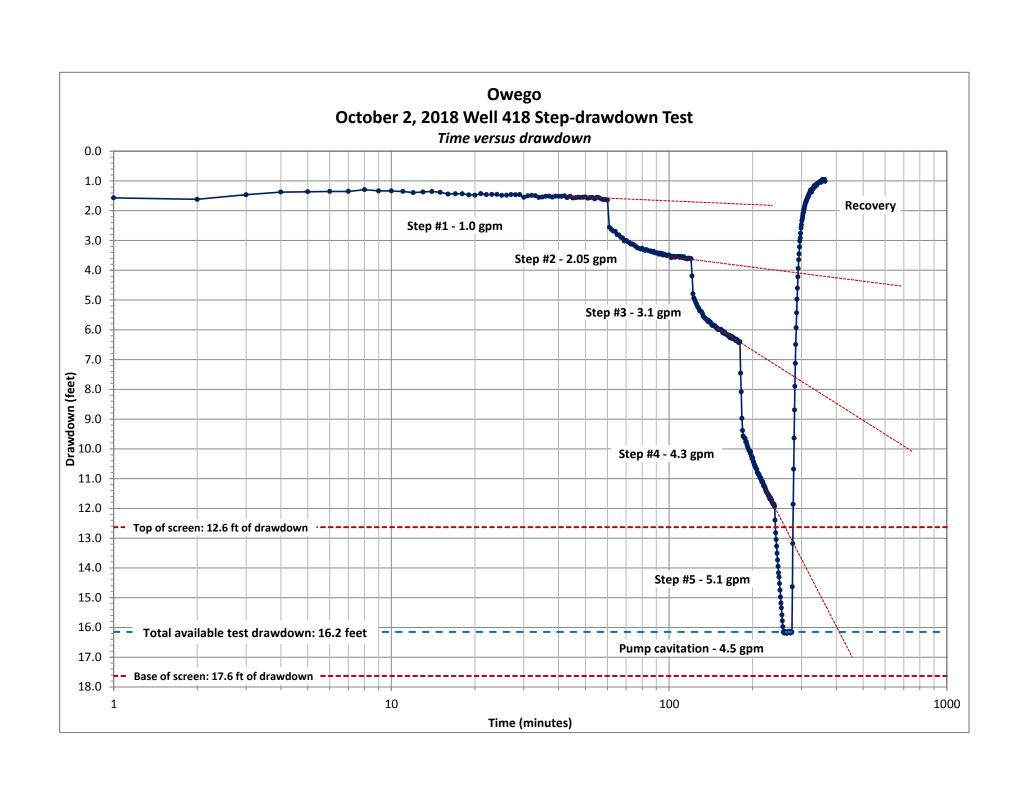
Date and Time	Logger Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
Date and Time	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/2/2018 10:11	5.69	12.21	28.93	131	5.40			
10/2/2018 10:12	5.66	12.22	28.99	132	5.46			
10/2/2018 10:13	5.63	12.21	29.08	133	5.55			
10/2/2018 10:14	5.61	12.21	29.12	134	5.59			
10/2/2018 10:15	5.59	12.18	29.15	135	5.62			
10/2/2018 10:16	5.58	12.25	29.18	136	5.65			
10/2/2018 10:17	5.58	12.20	29.19	137	5.66			
10/2/2018 10:18	5.55	12.22	29.25	138	5.72			
10/2/2018 10:19	5.56	12.21	29.23	139	5.69			
10/2/2018 10:20	5.54	12.21	29.29	140	5.75			
10/2/2018 10:21	5.54	12.18	29.27	141	5.74			
10/2/2018 10:22	5.51	12.20	29.34	142	5.80			
10/2/2018 10:23	5.49	12.24	29.39	143	5.86			
10/2/2018 10:24	5.50	12.19	29.36	144	5.83			
10/2/2018 10:25	5.49	12.22	29.40	145	5.87			
10/2/2018 10:26	5.49	12.24	29.39	146	5.86			
10/2/2018 10:27	5.48	12.22	29.42	147	5.89			
10/2/2018 10:28	5.46	12.21	29.46	148	5.93			
10/2/2018 10:29	5.46	12.21	29.47	149	5.93			
10/2/2018 10:30	5.43	12.23	29.53	150	6.00			
10/2/2018 10:31	5.43	12.21	29.52	151	5.99			
10/2/2018 10:32	5.43	12.21	29.52	152	5.99			
10/2/2018 10:33	5.43	12.21	29.52	153	5.99			
10/2/2018 10:34	5.44	12.22	29.52	154	5.99			
10/2/2018 10:35	5.42	12.23	29.56	155	6.03			
10/2/2018 10:36	5.39	12.25	29.63	156	6.09			
10/2/2018 10:37	5.41	12.22	29.58	157	6.05			
10/2/2018 10:38	5.38	12.23	29.65	158	6.12			
10/2/2018 10:39	5.39	12.22	29.62	159	6.08			
10/2/2018 10:40	5.37	12.22	29.68	160	6.15			
10/2/2018 10:41	5.36	12.23	29.68	161	6.15			
10/2/2018 10:42	5.36	12.20	29.70	162	6.17			
10/2/2018 10:43	5.35	12.20	29.71	163	6.18			
10/2/2018 10:44	5.34	12.20	29.75	164	6.22			
10/2/2018 10:45	5.35	12.22	29.71	165	6.18			
10/2/2018 10:46	5.31	12.20	29.80	166	6.27			
10/2/2018 10:47	5.33	12.19	29.76	167	6.23			
10/2/2018 10:48	5.30	12.21	29.82	168	6.29			
10/2/2018 10:49	5.33	12.23	29.76	169	6.23			
10/2/2018 10:50	5.30	12.19	29.83	170	6.29			
10/2/2018 10:51	5.31	12.21	29.80	171	6.27			
10/2/2018 10:52	5.29	12.20	29.85	172	6.32			
10/2/2018 10:53	5.29	12.21	29.85	173	6.32			
10/2/2018 10:54	5.27	12.22	29.90	174	6.36			
10/2/2018 10:55	5.29	12.22	29.85	175	6.32			
10/2/2018 10:56	5.27	12.22	29.90	176	6.37			
10/2/2018 10:57	5.27	12.20	29.90	177	6.37			

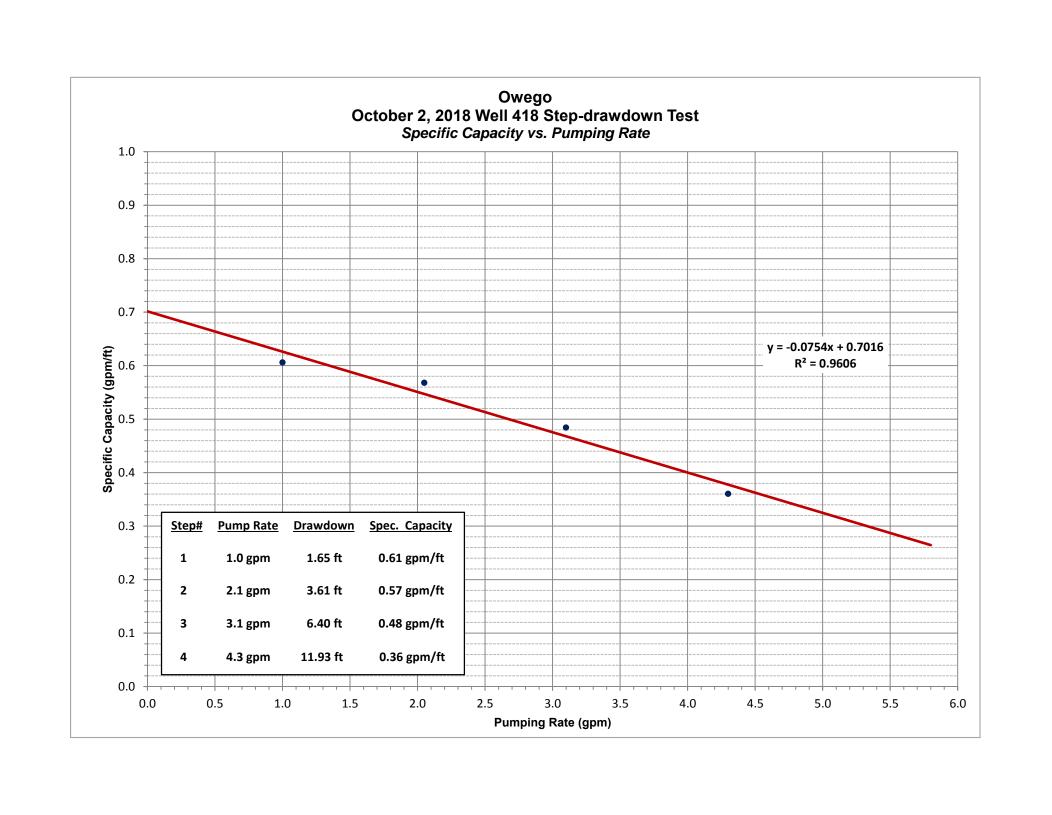
Date and Time	Logger Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
Date and Time	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/2/2018 10:58	5.24	12.21	29.96	178	6.43			
10/2/2018 10:59	5.25	12.20	29.94	179	6.41			
10/2/2018 11:00	5.25	12.23	29.94	180	6.40	61989.2	3.43	Step #4
10/2/2018 11:01	4.80	12.23	30.99	181	7.46			Target: 4 gpm
10/2/2018 11:02	4.53	12.23	31.62	182	8.09			
10/2/2018 11:03	4.14	12.19	32.51	183	8.97			
10/2/2018 11:04	3.96	12.22	32.92	184	9.39			
10/2/2018 11:05	3.88	12.21	33.10	185	9.57			
10/2/2018 11:06	3.87	12.23	33.14	186	9.61			
10/2/2018 11:07	3.86	12.24	33.16	187	9.63			
10/2/2018 11:08	3.85	12.21	33.19	188	9.66			
10/2/2018 11:09	3.80	12.22	33.29	189	9.76			
10/2/2018 11:10	3.80	12.20	33.29	190	9.76			
10/2/2018 11:11	3.76	12.20	33.40	191	9.86			
10/2/2018 11:12	3.73	12.23	33.47	192	9.94			
10/2/2018 11:13	3.70	12.24	33.52	193	9.99			
10/2/2018 11:14	3.68	12.21	33.58	194	10.05			
10/2/2018 11:15	3.67	12.20	33.60	195	10.07			
10/2/2018 11:16	3.63	12.21	33.68	196	10.15			
10/2/2018 11:17	3.65	12.22	33.64	197	10.10			
10/2/2018 11:18	3.60	12.22	33.76	198	10.23			
10/2/2018 11:19	3.56	12.23	33.85	199	10.32			
10/2/2018 11:20	3.57	12.21	33.84	200	10.30			
10/2/2018 11:21	3.52	12.25	33.95	201	10.42			
10/2/2018 11:22	3.50	12.23	34.00	202	10.46			
10/2/2018 11:23	3.46	12.22	34.07	203	10.54			
10/2/2018 11:24	3.45	12.24	34.09	204	10.56			
10/2/2018 11:25	3.43	12.21	34.15	205	10.61			
10/2/2018 11:26	3.41	12.22	34.20	206	10.66			
10/2/2018 11:27	3.40	12.20	34.23	207	10.70			
10/2/2018 11:28	3.36	12.22	34.32	208	10.79			
10/2/2018 11:29	3.35	12.24	34.35	209	10.81			
10/2/2018 11:30	3.32	12.24	34.40	210	10.87			
10/2/2018 11:31	3.33	12.19	34.39	211	10.86			
10/2/2018 11:32	3.29	12.24	34.46	212	10.93			
10/2/2018 11:33	3.27	12.22	34.51	213	10.98			
10/2/2018 11:34	3.27	12.21	34.51	214	10.98			
10/2/2018 11:35	3.24	12.22	34.58	215	11.05		ļ	
10/2/2018 11:36	3.21	12.21	34.65	216	11.12			
10/2/2018 11:37	3.23	12.22	34.62	217	11.09			
10/2/2018 11:38	3.20	12.16	34.67	218	11.14			
10/2/2018 11:39	3.16	12.20	34.77	219	11.24			
10/2/2018 11:40	3.16	12.21	34.77	220	11.24			
10/2/2018 11:41	3.14	12.17	34.81	221	11.28			
10/2/2018 11:42	3.12	12.18	34.86	222	11.32			
10/2/2018 11:43	3.10	12.20	34.92	223	11.38			
10/2/2018 11:44	3.08	12.20	34.97	224	11.43		<u> </u>	

	Logger		2010 Step-1					
Date and Time	Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	
10/2/2018 11:45	3.07	12.20	34.99	225	11.46			
10/2/2018 11:46	3.05	12.23	35.02	226	11.49			
10/2/2018 11:47	3.04	12.22	35.05	227	11.52			
10/2/2018 11:48	3.02	12.21	35.10	228	11.57			
10/2/2018 11:49	3.02	12.21	35.10	229	11.57			
10/2/2018 11:50	2.99	12.21	35.17	230	11.64			
10/2/2018 11:51	2.97	12.18	35.22	231	11.69			
10/2/2018 11:52	2.99	12.20	35.17	232	11.64			
10/2/2018 11:53	2.95	12.20	35.25	233	11.72			
10/2/2018 11:54	2.96	12.19	35.24	234	11.71			
10/2/2018 11:55	2.92	12.21	35.32	235	11.78			
10/2/2018 11:56	2.91	12.21	35.35	236	11.81			
10/2/2018 11:57	2.89	12.21	35.39	237	11.85			
10/2/2018 11:58	2.89	12.20	35.40	238	11.86			
10/2/2018 11:59	2.89	12.17	35.40	239	11.87			
10/2/2018 12:00	2.86	12.20	35.47	240	11.93	62231.5	4.04	Step #5
10/2/2018 12:01	2.66	12.17	35.93	241	12.40			Target: 5 gpm
10/2/2018 12:02	2.47	12.23	36.36	242	12.82			0 01
10/2/2018 12:03	2.38	12.21	36.58	243	13.05			
10/2/2018 12:04	2.28	12.22	36.80	244	13.27			
10/2/2018 12:05	2.18	12.21	37.04	245	13.51			
10/2/2018 12:06	2.08	12.22	37.27	246	13.74			
10/2/2018 12:07	1.99	12.20	37.48	247	13.95			
10/2/2018 12:08	1.89	12.23	37.70	248	14.17			
10/2/2018 12:09	1.83	12.26	37.84	249	14.30			
10/2/2018 12:10	1.74	12.24	38.06	250	14.53			
10/2/2018 12:11	1.64	12.26	38.28	251	14.74			
10/2/2018 12:12	1.54	12.24	38.51	252	14.98			
10/2/2018 12:13	1.45	12.27	38.71	253	15.18			
10/2/2018 12:14	1.38	12.27	38.87	254	15.34			
10/2/2018 12:15	1.28	12.25	39.11	255	15.58			
10/2/2018 12:16	1.19	12.23	39.31	256	15.78			
10/2/2018 12:17	1.11	12.25	39.51	257	15.98			
10/2/2018 12:18	1.03	12.27	39.69	258	16.16			
10/2/2018 12:19	1.04	12.24	39.67	259	16.14			
10/2/2018 12:20	1.01	12.26	39.73	260	16.19			
10/2/2018 12:21	1.03	12.26	39.69	261	16.16			
10/2/2018 12:22	1.04	12.28	39.67	262	16.14			
10/2/2018 12:23	1.03	12.28	39.70	263	16.16			
10/2/2018 12:24	1.03	12.27	39.69	264	16.16			
10/2/2018 12:25	1.01	12.26	39.74	265	16.20			
10/2/2018 12:26	1.02	12.29	39.72	266	16.18			
10/2/2018 12:27	1.02	12.29	39.71	267	16.18			
10/2/2018 12:28	1.03	12.30	39.69	268	16.16			
10/2/2018 12:29	1.04	12.29	39.67	269	16.14			
10/2/2018 12:30	1.03	12.25	39.68	270	16.15			
10/2/2018 12:31	1.04	12.24	39.67	271	16.13			

Date and Time	Logger Pressure	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Notes
Date and Time	(PSI)	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes
10/2/2018 12:32	1.03	12.29	39.69	272	16.16			
10/2/2018 12:33	1.04	12.28	39.67	273	16.14			
10/2/2018 12:34	1.01	12.25	39.73	274	16.20			
10/2/2018 12:35	1.02	12.29	39.71	275	16.17			
10/2/2018 12:36	1.02	12.26	39.70	276	16.17			
10/2/2018 12:37	1.03	12.29	39.69	277	16.16			
10/2/2018 12:38	1.69	12.26	38.17	278	14.63	62419.5	4.95	End of test
10/2/2018 12:39	2.32	12.29	36.71	279	13.18		0	Recovery
10/2/2018 12:40	2.89	12.29	35.40	280	11.87		0	
10/2/2018 12:41	3.40	12.28	34.21	281	10.68		0	
10/2/2018 12:42	3.85	12.29	33.17	282	9.64		0	
10/2/2018 12:43	4.26	12.29	32.23	283	8.69		0	
10/2/2018 12:44	4.61	12.27	31.43	284	7.90		0	
10/2/2018 12:45	4.94	12.28	30.66	285	7.13		0	
10/2/2018 12:46	5.22	12.26	30.03	286	6.49		0	
10/2/2018 12:47	5.46	12.25	29.46	287	5.93		0	
10/2/2018 12:48	5.68	12.30	28.96	288	5.43		0	
10/2/2018 12:49	5.88	12.24	28.50	289	4.97		0	
10/2/2018 12:50	6.04	12.25	28.13	290	4.60		0	
10/2/2018 12:51	6.20	12.26	27.75	291	4.22		0	
10/2/2018 12:52	6.32	12.28	27.47	292	3.94		0	
10/2/2018 12:53	6.45	12.25	27.18	293	3.64		0	
10/2/2018 12:54	6.53	12.25	26.98	294	3.45		0	
10/2/2018 12:55	6.64	12.27	26.75	295	3.21		0	
10/2/2018 12:56	6.72	12.24	26.55	296	3.02		0	
10/2/2018 12:57	6.77	12.25	26.45	297	2.92		0	
10/2/2018 12:58	6.83	12.26	26.29	298	2.76		0	
10/2/2018 12:59	6.91	12.25	26.11	299	2.58		0	
10/2/2018 13:00	6.96	12.26	26.00	300	2.47		0	
10/2/2018 13:01	7.02	12.25	25.87	301	2.34		0	
10/2/2018 13:02	7.05	12.23	25.80	302	2.27		0	
10/2/2018 13:03	7.08	12.25	25.71	303	2.18		0	
10/2/2018 13:04	7.12	12.26	25.63	304	2.10		0	
10/2/2018 13:05	7.14	12.24	25.59	305	2.06		0	
10/2/2018 13:06	7.18	12.22	25.50	306	1.97		0	
10/2/2018 13:07	7.20	12.25	25.45	307	1.92		0	
10/2/2018 13:08	7.22	12.22	25.39	308	1.86		0	
10/2/2018 13:09	7.25	12.24	25.33	309	1.80		0	
10/2/2018 13:10	7.27	12.25	25.29	310	1.75		0	
10/2/2018 13:11	7.29	12.25	25.24	311	1.70		0	
10/2/2018 13:12	7.31	12.24	25.19	312	1.66		0	
10/2/2018 13:13	7.31	12.26	25.19	313	1.66		0	
10/2/2018 13:14	7.33	12.24	25.13	314	1.60		0	
10/2/2018 13:15	7.34	12.26	25.11	315	1.58		0	
10/2/2018 13:16	7.35	12.23	25.09	316	1.56		0	
10/2/2018 13:17	7.38	12.25	25.03	317	1.50		0	
10/2/2018 13:18	7.37	12.23	25.05	318	1.52		0	

	-	,	.		i iest							
Data and Thur	Logger	Logger Temp.	Depth to	Test Time	Drawdown	Totalizer	Ave Flow	Nata				
Date and Time	Pressure	(deg. C)	Water (ft)	(minute)	(feet)	(gallons)	Rate (gpm)	Notes				
10/2/2010 12:10	(PSI)	42.22	24.00	210	1 45		0					
10/2/2018 13:19	7.40 7.41	12.23	24.98	319	1.45 1.42		0					
10/2/2018 13:20		12.25	24.95	320								
10/2/2018 13:21	7.41	12.24	24.95	321	1.42		0					
10/2/2018 13:22	7.43	12.24	24.91	322	1.38		0					
10/2/2018 13:23	7.46	12.26	24.85	323	1.32		0					
10/2/2018 13:24	7.45	12.24	24.86	324	1.33		0					
10/2/2018 13:25	7.47	12.25	24.83	325	1.30		0					
10/2/2018 13:26	7.43	12.25	24.91	326	1.38		0					
10/2/2018 13:27	7.47	12.26	24.81	327	1.28		0					
10/2/2018 13:28	7.47	12.25	24.81	328	1.28		0					
10/2/2018 13:29	7.48	12.23	24.79	329	1.26		0					
10/2/2018 13:30	7.48	12.22	24.80	330	1.27		0					
10/2/2018 13:31	7.49	12.21	24.77	331	1.24		0					
10/2/2018 13:32	7.50	12.22	24.74	332	1.21		0					
10/2/2018 13:33	7.52	12.25	24.70	333	1.17		0					
10/2/2018 13:34	7.50	12.24	24.74	334	1.21		0					
10/2/2018 13:35	7.51	12.23	24.73	335	1.20		0					
10/2/2018 13:36	7.54	12.25	24.67	336	1.14		0					
10/2/2018 13:37	7.52	12.19	24.70	337	1.17		0					
10/2/2018 13:38	7.53	12.25	24.69	338	1.16		0					
10/2/2018 13:39	7.53	12.22	24.68	339	1.14		0					
10/2/2018 13:40	7.53	12.23	24.68	340	1.15		0					
10/2/2018 13:41	7.55	12.25	24.63	341	1.10		0					
10/2/2018 13:42	7.55	12.23	24.64	342	1.11		0					
10/2/2018 13:43	7.57	12.23	24.60	343	1.07		0					
10/2/2018 13:44	7.56	12.24	24.61	344	1.08		0					
10/2/2018 13:45	7.57	12.22	24.59	345	1.06		0					
10/2/2018 13:46	7.57	12.23	24.59	346	1.06		0					
10/2/2018 13:47	7.58	12.20	24.57	347	1.04		0					
10/2/2018 13:48	7.58	12.24	24.58	348	1.04		0					
10/2/2018 13:49	7.58	12.23	24.57	349	1.04		0					
10/2/2018 13:50	7.59	12.24	24.55	350	1.02		0					
10/2/2018 13:51	7.59	12.25	24.55	351	1.01		0					
10/2/2018 13:52	7.58	12.24	24.57	352	1.03		0					
10/2/2018 13:53	7.58	12.24	24.58	353	1.04		0					
10/2/2018 13:54	7.59	12.23	24.54	354	1.01		0					
10/2/2018 13:55	7.60	12.24	24.53	355	1.00		0					
10/2/2018 13:56	7.60	12.23	24.52	356	0.99		0					
10/2/2018 13:57	7.62	12.25	24.48	357	0.95		0					
10/2/2018 13:58	7.61	12.24	24.49	358	0.96		0					
10/2/2018 13:59	7.61	12.24	24.49	359	0.96		0					
10/2/2018 14:00	7.60	12.24	24.53	360	0.99		0					
10/2/2018 14:01	7.61	12.24	24.50	361	0.96		0					
10/2/2018 14:02	7.61	12.24	24.50	362	0.97		0					
10/2/2018 14:03	7.61	12.22	24.49	363	0.96		0					
10/2/2018 14:04	7.62	12.22	24.49	364	0.95		0					
10/2/2018 14:05	7.59	12.25	24.54	365	1.01		0					
10/2/2010 14.03	7.53	12.23	24.54	505	1.01		U					





APPENDIX L

Vapor Intrusion Assessment - 2018 Annual Report by Sanborn, Head Engineering, PC

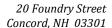


VAPOR INTRUSION ASSESSMENT 2018 ANNUAL REPORT

Former IBM Owego Facility Owego, New York



Prepared for IBM Corporation File No. 4136.02 February 2019





Brandon Ashby, P.G., R.E.M. IBM Corporate Environmental Affairs 8976 Wellington Road Manassas, VA 20109 February 25, 2019 File No. 4136.02

Re: Vapor Intrusion Assessment – 2018 Annual Report

Former IBM Owego Facility

Owego, New York

EPA ID No. NYD986874501 NYSDEC Site No. 754006

Dear Mr. Ashby:

The enclosed report provides a summary of vapor intrusion assessment and mitigation-related work that was completed in 2018 at the former IBM Owego facility. We understand that this report will be included as an appendix to the facility's 2018 Annual Corrective Action Status Report. Please contact us if you have any questions.

Please contact us if you require additional information.

Very truly yours,

SANBORN, HEAD ENGINEERING, P.C.

David Shea, P.E.

President

Bradley A. Green, P.G.

Sanborn, Head & Associates, Inc.

Encl. Vapor Intrusion Assessment – 2018 Annual Report

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1.0 INTRODUCTION

This report summarizes the status of vapor intrusion (VI) assessment and mitigation-related work at the former IBM Owego Facility (the site) for the calendar year 2018. The site is currently owned and operated by Lockheed Martin Corporation (LM). This report (hereinafter referred to as the VI Assessment Annual Report) will be submitted to the New York State Department of Environmental Conservation (NYSDEC) as an attachment to the 2018 Annual Corrective Action Status Report.

A site location plan is provided as Figure 1, and a map of site buildings is provided as Figure 2. The work described herein was conducted on behalf of IBM by Sanborn, Head Engineering, PC (SHPC) in general accordance with IBM's Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan – Soil Vapor Intrusion Assessment dated February 1, 2017 (RFI Work Plan), and the B001 Interim Indoor Air Monitoring Work Plan dated February 23, 2018 (B001 Work Plan – note this was mistakenly dated February 23, 2017). Both above-referenced work plans were approved by the NYSDEC and the New York State Department of Health (collectively, the Agencies).

The services conducted, and this report are subject to the standard limitations for this type of work, as described in Appendix A.

1.1 Report Organization

This report is organized into five sections as described below:

Section 1 presents a general introduction, including the objectives and scope of the report, and a summary of the status of the buildings that were the focus of the RFI Work Plan.

Section 2 summarizes the status of heating, ventilating, and air conditioning (HVAC) operations and occupancy for buildings 001, 002, and 351 in 2018.

Section 3 summarizes the results of indoor air sampling performed in B001 in 2018.

Section 4 provides a summary of subslab depressurization (SSD) system operation and performance in 2018.

Section 5 provides a summary of upcoming activities at the site.

1.2 Objectives and Scope

The purpose of this report is to summarize the status of VI assessment and mitigation-related work at the site, and to provide system performance data for the existing SSD systems in Building 002 (B002) and Building 351 (B351), for the calendar year 2018. Additionally, the work in 2018 included indoor air quality (IAQ) sampling in Building 001 (B001) as an approved interim measure pending the establishment of a forthcoming VI Performance Monitoring Plan (PMP).

IBM is currently implementing a "Work Plan for Soil Vapor Intrusion Engineering Control Demonstration Project" (EC Work Plan) for the IBM Poughkeepsie and Former IBM Endicott facilities¹, which was approved by the Agencies on June 13, 2017. The results from that project will be used to inform decisions related to on-going monitoring at other sites (including the former IBM Owego site), which will be part of the basis for the above-described forthcoming PMP. Because the work described in the EC Work Plan is still in progress, IBM agreed to conduct indoor air sampling in B001 in 2018 before the above-described PMP is established.

IBM is working cooperatively with the site owner, LM, to maintain the appropriate HVAC operating conditions necessary for VI mitigation in routinely occupied portions of buildings B001 and B002. For B351, HVAC is not part of VI mitigation system, and it is therefore not necessary to monitor HVAC operations. It is LM's responsibility to communicate to IBM planned changes to occupancy or HVAC conditions in buildings B001 and B002, so that IBM can assess whether additional indoor air quality (IAQ) testing is warranted. IBM maintains responsibility for operation and maintenance (O&M) of the SSD systems located in B002 and B351.

Other work conducted in 2018 included a soil vapor extraction (SVE) remedial alternative assessment to evaluate the feasibility of volatile organic compound (VOC) source reduction within vadose zone soils beneath B002 and the B306/former tank farm area. The results of this assessment were provided in a report submitted to the NYSDEC on September 24, 2018² and are not discussed herein.

2.0 STATUS OF BUILDING HVAC AND OCCUPANCY

The status of HVAC conditions and occupancy for B001 and B002 were initially reviewed as part of the 2017 VI assessment and summarized in the December 2017 Soil Vapor Intrusion Assessment and Interim Corrective Measures (ICM) Report³. According to LM, neither HVAC operations nor building use/occupancy has changed in B002 in 2018 as compared to the 2017 conditions documented in the above-referenced report.

Prior to the December 2018 IAQ sampling in B001, LM reported that the outside air dampers for all the HVAC units in B001 were replaced. According to LM, the operating conditions for these HVAC units and the building use/occupancy for B001 were not changed as compared to the 2017 conditions documented in the above-referenced report. Refer to Section 3.1 for additional information.

¹ IBM Corporation and Sanborn Head Engineering P.C., Work Plan for Soil Vapor Intrusion Engineering Control Demonstration Project, IBM Poughkeepsie and Former IBM Endicott Facilities, April 2017

² Sanborn, Head Engineering, PC, Soil Vapor Extraction Remedial Alternative Assessment Report – Building 002 and Former Tank Farm Area, Owego, NY, former IBM Owego Facility, September 2018.

Sanborn, Head Engineering, PC, Soil Vapor Intrusion Assessment and Interim Corrective Measures (ICM) Report, Owego, NY, former IBM Owego Facility, December 2017.

3.0 B001 INDOOR AIR SAMPLING

B001 indoor air screening and sampling in 2018 was conducted at the locations shown on Figures 3 and 4 in accordance with the procedures described in the B001 Interim Indoor Air Work Plan and the RFI Work Plan. Indoor air screening was conducted with a portable gas chromatograph/electron capture device (GC/ECD) followed by collection of 8-hour time averaged indoor air samples using Summa® canisters.

3.1 HVAC Review

Consistent with the approach used for the 2017 sampling, the outside air exchange rate (AER) for each HVAC zone was reduced to a "reasonable worst-case condition" by locking the outside air (OA) dampers at their minimum allowable position (0% open) for at least 24 hours before and during the indoor air screening and sampling process. This approach was also followed for the December 2018 screening and sampling rounds.

In 2018, LM replaced the aging OA damper louvers and actuators for the 12 main air handling units (AHUs) that serve B001. The minimum allowable positions for these OA dampers (0% open) remained unchanged in 2018.

In 2017, the operating conditions for two HVAC systems were adjusted slightly to increase the AER and achieve slightly lower VOC indoor air concentrations under the presumption that these adjustments could be maintained after LM completed upgrades to its HVAC control system. As of the December 2018 sampling round, LM had not completed these upgrades. After further discussion with LM in December 2018, it was determined that the 2017 adjustments summarized in Exhibit 1 were not maintained in 2018, nor can they be sustained in the future. Therefore, in December 2018, the HVAC operating conditions for the two HVAC systems listed in Exhibit 1 were re-adjusted to conditions that LM can sustain. These are the conditions under which the December 2018 indoor air sampling was conducted.

Exhibit 1 – Summary of Adjustments to HVAC Operating Conditions – 2017 vs. 2018

HVAC Unit	October 2017	December 2018								
	8-Hr Summa Sampling Round	Round 1 GC/ECD Screening	Rounds 2 and 3 GC/ECD Screening & 8-Hr Summa Sampling Round							
103C/D	Fan speed manually set to constant (100%)	Fan speed manually set to constant (100%)	2017 fan speed not sustainable. Fan speed varies based on pressure/temperature demands in space							
1394	Makeup air damper position from Unit 102D manually set to constant (100%)	Makeup air damper position from Unit 102D manually set to constant (100%)	2017 makeup air damper position not sustainable. Damper position various based on temperature / pressure demands in space.							

3.2 Indoor Air Screening

On December 11 and 12, 2018, indoor air screening with a GC/ECD was conducted for TCE at the 17 locations in B001 shown on Figure 3. Except for IA001-055, these are the same locations where 8-hr indoor air sampling using Summa® canisters was performed in 2017. IA001-055 was added to the screening program to provide spatial coverage in the northeast portion of B001. Three rounds of screening were conducted in 2018 and the results are presented on Figure 3. Approximately 24 hours before the 2018 screening and sampling, the AER for each HVAC zone was reduced to a reasonable worst-case condition by locking the OA dampers at their minimum allowable position (0% open). Screening round 1 was conducted under HVAC operating conditions like the October 2017 indoor air sampling round. For screening rounds 2 and 3, and the 8-hr Summa canister indoor air sampling round, adjustments were made to HVAC operating conditions that LM can sustain with its existing systems.

As summarized on Figure 3, TCE screening concentrations in rounds 2 and 3 were less than or similar to the concentrations from round 1, suggesting that the HVAC operational adjustment made before rounds 2 and 3 were beneficial or not consequential. The screening concentrations from rounds 2 and 3 were collected on the same day as the 8-hr Summa® canister indoor air samples further discussed below. In general, the TCE screening concentrations from rounds 2 and 3 were similar to, or slightly greater than, the results of the 8-hr Summa® canister sampling.

3.3 Indoor Air Sampling and Results

Summa ® sampling was conducted on December 12, 2018 at seven locations in B001 shown on Figure 4. Locations selected for Summa® sampling were where the TCE concentrations in indoor air Summa® samples collected in 2017 were greater than or equal to 2 μ g/m³, and/or where IBM previously evaluated adjustment of HVAC operating conditions. Indoor air samples were submitted for laboratory analysis by USEPA Method TO-15 in selective ion monitoring (SIM) mode for the same list of analytes as the October 2017 sampling round.

The TCE concentration results for the October 2017 and December 2018 8-hr Summa® canister indoor air sampling rounds are shown on Figure 4. Table 1 summarizes the concentrations of all analytes from the 2017 and 2018 sampling rounds. The analytical laboratory report and data usability assessment for the 2018 indoor air samples are provided in Appendix B.

TCE was reported in the December 2018 indoor air samples at concentrations ranging from not detected (less than 1.6 $\mu g/m^3$) to 3.9 $\mu g/m^3$, with an arithmetic mean of 1.8 $\mu g/m^3$. These results are generally consistent with previous results from the October 2017 sampling round.

As shown in Table 1, 1,2-dichloroethane (1,2-DCA) was the only other analyte detected in the 2018 indoor air samples in one field duplicate sample collected from location IA001-010; however, it was not detected in the primary sample at this location. 1,2-DCA was also detected in the ambient air sample collected in 2018 and in samples from the October 2017 sampling round, but at concentrations less than $1 \mu g/m^3$.

4.0 SUBSLAB DEPRESSURIZATION AND SOIL VAPOR EXTRACTION SYSTEMS

In 2018, operations continued for the SSD systems in B002 and B351. The design objectives for the SSD systems are to depressurize the subslab, and prevent VOC vapors from migrating into indoor air. The B002 SSD system also serves a dual purpose of reducing vadose zone VOC concentrations as further discussed below.

The B002 and B351 SSD systems are designed for continuous operation. They are each equipped with a control panel and cellular modem that can be monitored remotely. Operating personnel are automatically notified in the event of any system alarms, including those that cause a system shut down.

In addition to automatic alarm monitoring, IBM conducts periodic operational checks and monitoring of system performance. Operations checks in 2018 included weekly checks of system operating parameters (e.g., system vacuum, temperature, blower speed), the results of which are recorded on a log sheet. Performance monitoring in 2018 included semi-annual monitoring of subslab vacuum conditions, monthly or quarterly sampling of extracted vapor to track VOC mass removal, and monthly sampling of the B002 SSD process vapor to assess when change-out of the granular activated carbon (GAC) vapor treatment units is appropriate.

Operation and performance summaries of these systems are provided below.

4.1 B002 SSD System

As summarized in the ICM Report, the B002 SSD system began operation in August 2017. Review of the 2018 operations log sheets indicates that the system operated consistently without any significant shutdowns. Semi-annual monitoring of vacuum field conditions was also conducted to verify adequate subslab (0-2 ft below ground surface [bgs]), intermediate (2-6 ft bgs), and deep (>6 ft bgs) soil vapor depressurization. The June 2018 readings, along with the applied vacuum and extracted vapor flow rate at the two extraction ports in operation, and the approximate extent of soil vapor depressurization, are shown on Figures 5 through 7. Based on review of the operations log sheets and the subslab vacuum measurements, the SSD system operated in accordance with its design objectives, and is removing VOC mass from the subslab, intermediate, and deep portions of the vadose zone.

Treatment system process vapor samples were collected monthly and analyzed for VOCs. Approximately 35 pounds of VOCs were removed from the subsurface during 2018, bringing the total VOC mass removed since the August 2017 system startup to approximately 96 pounds. A summary of mass removal rate and cumulative mass removed is shown on Exhibit 2 below.

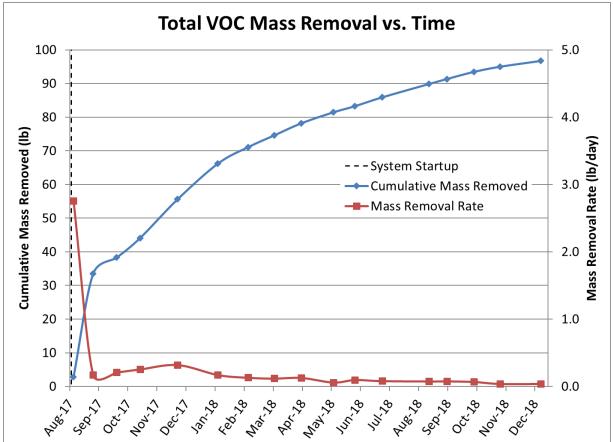


Exhibit 2 - B002 Total VOC Mass Removal vs. Time

4.2 B351 SSD System

As summarized in the ICM Report, the B351 SSD system began operation in August 2017. Review of the 2018 operations log sheets indicates the system operated consistently without any significant shutdowns. The July 2018 readings of cross-slab differential pressure readings within B351, along with the applied vacuums and extracted vapor flow rates at each of the operating extraction ports, and the approximate extent of subslab depressurization, are shown on Figure 8. Based on review of the operations log sheets and the cross-slab differential pressure measurements, the SSD system operated in accordance with its design objectives.

Samples of extracted vapor were collected approximately quarterly and analyzed for VOCs. Approximately 2 pounds of VOCs were removed from the subsurface during 2018, bringing the total mass of VOCs removed since the August 2017 system startup to approximately 4 pounds. A plot of mass removal rate and cumulative mass removed since system start-up is shown on Exhibit 3 below.

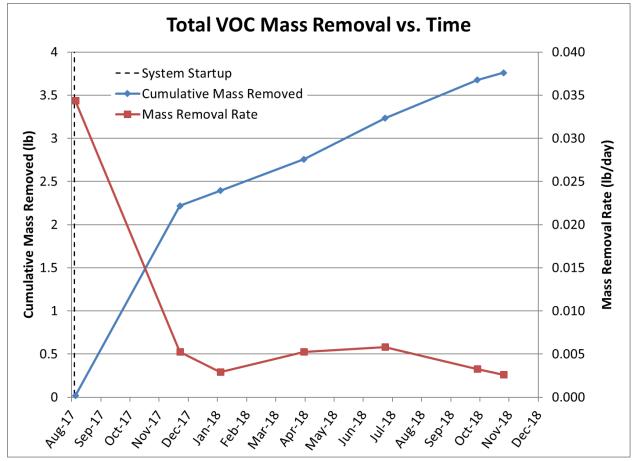


Exhibit 3 - VE2 PCE Mass Removal vs. Time

5.0 SUMMARY AND UPCOMING ACTIVITIES

In 2018, IBM completed a round of indoor air screening and sampling in B001 consistent with the approach described in the B001 Work Plan, which was approved by the Agencies. IBM worked cooperatively with LM in 2018 to stay abreast of potential changes to HVAC infrastructure or operations, and/or changes to building use or occupancy. LM indicated that building use and occupancy, and HVAC operations did not change in 2018 relative to the conditions from the October 2017 sampling round except for minor adjustments to the fan speed and makeup air damper position of two units.

TCE screening and sampling concentrations in 2018 in B001 were less than or consistent with concentrations observed in 2017, confirming that indoor air quality has not appreciably changed. Consistent with the conclusions approved by the Agencies in the 2017 ICM Report, IBM believes that given the non-residential workplace setting, the TCE concentrations observed in B001 in 2018 do not present an unacceptable risk to human health that would warrant further action beyond on-going HVAC operational monitoring checks and verification of building use and occupancy.

Based on our discussions with LM, it is unclear if or when additional modifications/upgrades to the HVAC systems in B001 might occur. In 2019, IBM intends to conduct two site visits with LM representatives to evaluate whether changes to building use or occupancy, and/or changes to HVAC infrastructure or operations have occurred. If significant changes have occurred, IBM will consult with the Agencies and evaluate whether additional indoor air screening or sampling is recommended.

Based on evaluation of 2018 operational records, periodic monitoring, and the results from subslab vacuum monitoring, the B002 and B351 SSD systems are meeting their design objectives of depressurizing the subslab and preventing VOC vapors from migrating into indoor air. In total, the B002 and B351 systems have successfully removed approximately 100 lbs of VOCs since startup of these systems in 2017. IBM will continue operation, maintenance, and performance monitoring of the SSD systems in B002 and B351 in 2019 in a manner consistent with the approach of 2018.

Following completion of the EC Work Plan for the IBM Poughkeepsie and former IBM Endicott sites, IBM will prepare a VI engineering control PMP for the Owego site by the end of 2019 that addresses how the engineering controls will be operated, maintained, and monitored, including the B001 and B002 HVAC systems, and the B002 and B351 SSD systems. We note that IBM's proposed long-term monitoring in the forthcoming PMP will likely be different than the monitoring performed in 2018. IBM will prepare a 2019 annual report of vapor intrusion monitoring and mitigation, which will be included as an attachment to the Annual Corrective Action Status Report.

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TABLE

Table 1 Summary of Indoor Air 8-Hour Confirmatory Sampling Results - B001 Former IBM Owego Facility Owego, New York

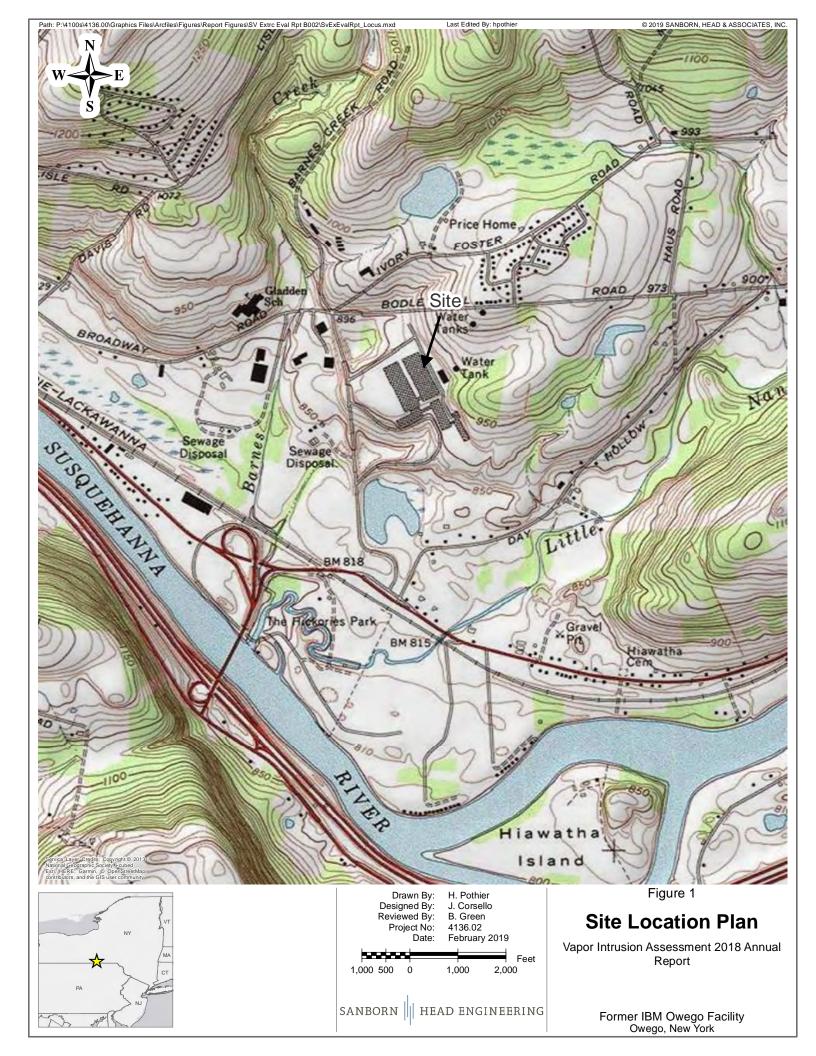
		Concentrations in μg/m ³																							
Sample Location	Sample Date	Dichlo	roethane ([1,1-)	Dichlo	roethane ([1,2-)	Dichlo	roethene ([1,1-)	Dichlor	oethene (c	is-1,2-)	Tetra	chloroeth (PCE)	ene	Trichlo	roethane (1,1,1-)	Tric	hloroethe (TCE)	ne	Vii	nyl chlorid	de
		Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	Bias	Result	Qualifier	r Bias
AA001-001	10/19/2017	0.081	U		0.081	U		0.079			0.079			0.14			0.11			0.11			0.051		T
AA001-001	12/12/2018	0.12	U		0.23			0.061	U		0.12	U		0.21	U		0.17	U		0.16	U		0.039	U	
IA001-004	10/19/2017	0.12			0.085			0.14			0.13			0.16			0.34			2.9			0.051	U	
IA001-004 DUP	10/19/2017	0.15			0.081	U		0.16			0.14			0.16			0.37			2.8			0.051	U	
IA001-004	12/12/2018	0.66	U		0.66	U		0.32	U		0.65	U		1.1	U		0.89	U		0.95			0.21	U	
IA001-010	10/19/2017	0.20			0.081	U		0.079	U		0.26			0.18			0.42			3.4			0.051	U	
IA001-010	12/12/2018	1.3	U		1.3	UJ	I	0.65	U		1.3	U		2.2	U		1.8	U		3.9			0.42	U	
IA001-010 DUP	12/12/2018	1.3	U		13	J	I	0.63	U		1.3	U		2.2	U		1.7	U		3.9			0.41	U	
IA001-014	10/19/2017	0.18			0.081	U		0.15			0.41			0.14	U		0.33			2.0			0.051	U	
IA001-014	12/12/2018	1.3	U		1.3	U		0.63	U		1.3	U		2.2	U		1.7	U		1.7	U		0.41	U	
IA001-021	10/19/2017	0.15			0.081	U		0.11			0.23			0.14	U		0.39			1.8			0.051	U	
IA001-021	12/12/2018	0.65	U		0.65	U		0.32	U		0.63	U		1.1	U		0.87	U		2.2			0.20	U	
IA001-025	10/19/2017	0.089			0.081	U		0.16			0.10			0.14	U		0.27			2.1			0.051	U	
IA001-025	12/12/2018	0.32	U		0.32	U		0.16	U		0.32	U		0.54	U		0.44	U		0.68			0.10	U	
IA001-034	10/19/2017	0.13			0.081	U		0.11			0.17			0.14	U		0.38			2.1			0.051	U	
IA001-034	12/12/2018	0.34	U		0.34	U		0.17	U		0.33	U		0.57	U		0.46	U		1.8			0.11	U	
IA001-052	10/19/2017	0.12			0.081	U		0.15			0.099			0.14	U		0.28			2.2			0.051	U	
IA001-052	12/12/2018	1.2	U		1.2	U		0.61	U		1.2	U		2.1	U		1.7	U		1.6	U		0.39	U	

Notes:

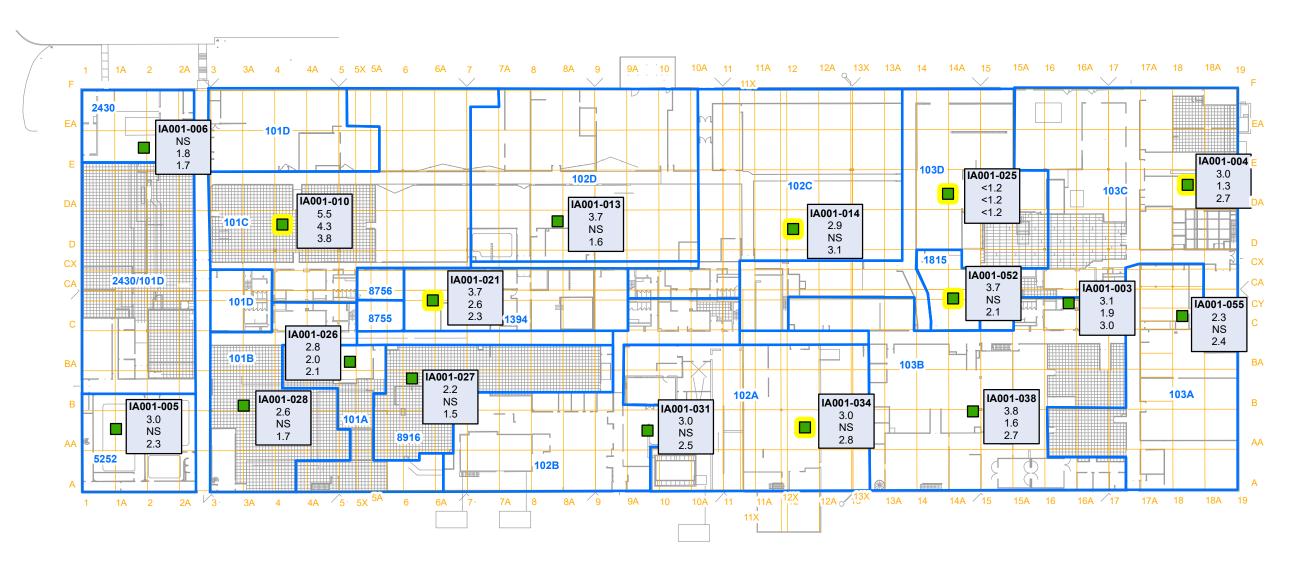
- 2. Concentrations are presented in micrograms per cubic meter (μg/m³), as reported by the laboratory.
- 3. An In-Depth data usability review (DUR) was performed on the October 2017 and December 2018 data by New Environmental Horizons, Inc. (NEH). All results were considered acceptable. In some cases, NEH assigned the following qualifier to the data. Refer to the Data Usability Summary Report reports for further details.
 - "U" indicates the analyte is non-detect at or above the indicated sample specific practical quantification limit (PQL).
 - "J" indicates the result is an estimated value.
 - "I" indicates an indeterminate bias.
- 4. The "AA" designation indicates that the sample consists of ambient air collected from outside the building.
- 5. Results were rounded to two significant figures.

^{1.} Samples were collected by Sanborn, Head Engineering, PC on the dates indicated. The samples collected in October 2017 were 8-hour samples collected in 2.7L SUMMA canisters and analyzed by Alpha Analytical of Westborough, Massachusetts for the project-specific list of volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method TO-15 in selective ion monitoring (SIM) mode. The samples collected in December 2018 were 8-hour samples collected in 6L SUMMA canisters and analyzed by Eurofins Air Toxics of Folsom by USEPA Method TO-15 SIM.

FIGURES







Summary of Indoor Air Screening Results - B001

Vapor Intrusion Assessment 2018 Annual Report

Former IBM Owego Facility

Owego, New York

Drawn By: H. Pothier
Designed By: E. Bosse
Reviewed By: B. Green
Project No: 4136.02
Date: February 2019

Figure Narrative

This figure shows trichloroethene (TCE) results for indoor air screening using a portable gas chromatograph / electron capture detector (GC / ECD). A description of each screening event is included in the legend and the text of this report. Results are shown in micrograms per cubic meter ($\mu g/m^3$).

Legend

Indoor Air Screening Location

IA001-004



Summa Canister Indoor Air Sampling Location (see Figure 4 for results)

102A

HVAC Zone and Designation

Portable GC / ECD Result (µg/m³)

1A001-004 Location and Designation
3.0 Round 1 - 12/11/18
1.3 Round 2 - 12/12/18 AM
2.7 Round 3 - 12/12/18 PM

NS Not Screened

30 15 0 30 60

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Summary of 8-hour Confirmatory Sampling Results - B001

Vapor Intrusion Assessment 2018 Annual Report

Former IBM Owego Facility

Owego, New York

Drawn By: H. Pothier
Designed By: E. Bosse
Reviewed By: B. Green
Project No: 4136.02
Date: February 2019

Figure Narrative

This figure shows trichloroethene (TCE) results for indoor air confirmatory laboratory analytical sampling with SUMMA canisters. A description of each sampling event is included in the legend and in the text of this report. The confirmatory laboratory samples were collected as 8-hour time-weighted samples using 2.7L SUMMA canisters. Results are shown in micrograms per cubic meter (µg/m³). Refer to Table 2 of this report for the full list of sampling results.

Legend

IA001-004

Indoor Air Screening Location (see Figure 3 for results)



Summa Canister Indoor Air Sampling Location

102A

HVAC Zone and Designation

Portable GC / ECD Result (µg/m³)

3.0

1.3

IA001-004 Location and Designation

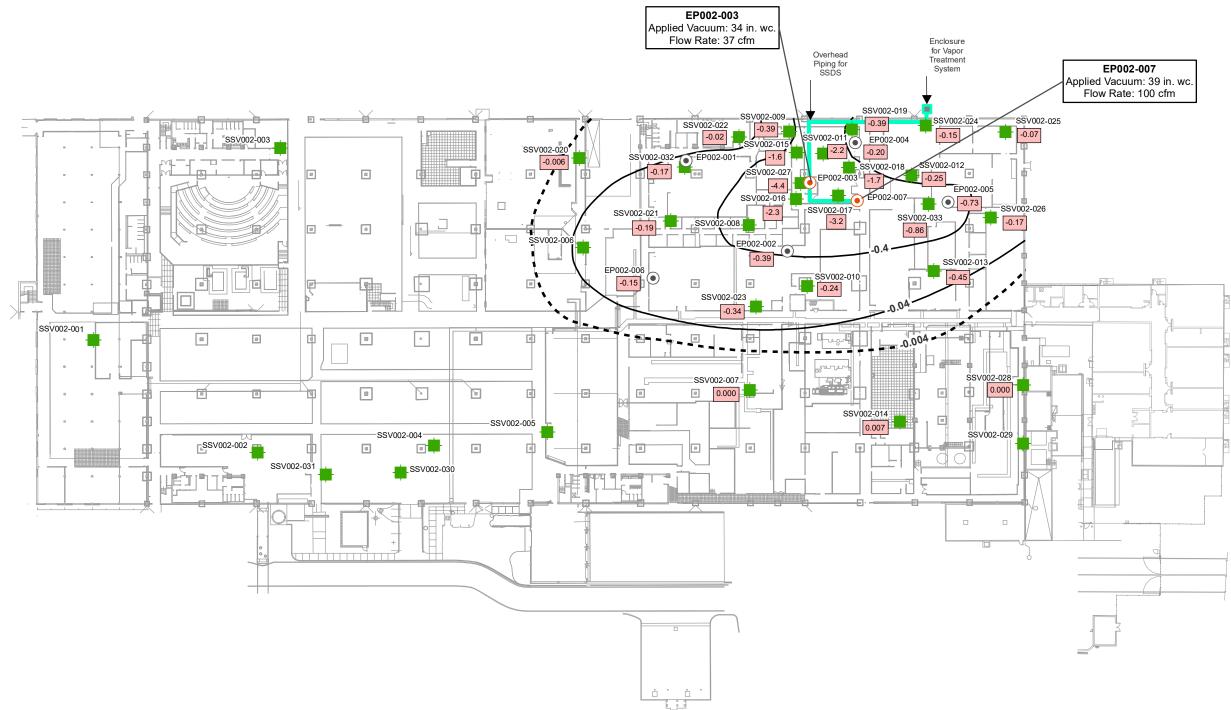
TCE Confirmatory SUMMA Result October 2017 (µg/m³)

October 2017 (µg/m²)

TCE Confirmatory SUMMA Result December 2018 (µg/m³)



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Extent of Subslab Depressurization

Building 002

Vapor Intrusion Assessment 2018 Annual Report

> Former IBM Owego Facility Owego, New York

> Drawn By: H. Pothier Designed By: J. Corsello Reviewed By: B. Green Project No: 4136.02 Date: February 2019

Figure Narrative

This figure shows measurements of differential pressure between indoor air and subslab vapor in units of inches of water column (in. wc) and the measurements recorded at each extraction port on June 20, 2018. Negative values indicate subslab pressures less than indoor pressure, or under vacuum, at the time of recording.

The -0.004 in wc contour represents the inferred apparent extent of subslab vacuum response. Actual vacuum conditions include components of vertical flow and are likely more complex than shown. Other interpretations are possible.

Legend

Subslab Vapor Monitoring Point

Subslab Extraction Port connected to depressurization (SSD) system

Subslab Extraction Port not connected to SSD system

---0:004--

Differential pressure contour (inches of water column). Dashed where less constrained.

EP002-003 in. wc

cfm

Extraction Port

Applied Vacuum (extraction port) inches of water column (in. wc)

Flow Rate (cu. ft. per min.)

-0.17

Observed pressure differential between the indoor or outdoor air and deep locations during soil vapor extraction testing (in. wc.). Negative values indicate subsurface pressure is less than the indoor or outdoor air pressure. "NA" indicates the reading was not attainable.



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Extent of Intermediate Depressurization

Building 002

Vapor Intrusion Assessment 2018 Annual Report

> Former IBM Owego Facility Owego, New York

Drawn By: H. Pothier Designed By: J. Corsello Reviewed By: B. Green Project No: 4136.02 Date: February 2019

Figure Narrative

This figure shows measurements of differential pressure between indoor air and intermediate subslab vapor in units of inches of water column (in. wc) and the measurements recorded at each extraction port on June 20, 2018. Negative values indicate intermediate subslab pressures less than indoor pressure, or under vacuum, at the time of recording.

The -0.004 in wc contour represents the inferred apparent extent of intermediate (defined as 2 to 6 ft below ground surface, which is typically above the depth of an intermittently present layer of asphalt) subslab vacuum response. Actual vacuum conditions include components of vertical flow and are likely more complex than shown. Other interpretations are possible.



Subslab Extraction Port connected to depressurization (SSD) system

Subslab Extraction Port not \odot connected to SSD system

Soil Vapor Monitoring Point

Soil Vapor Extraction Well

• Monitoring Well

Differential pressure contour ---0:004-- (inches of water column). Dashed where less constrained.

EP002-003 **Extraction Port**

Applied Vacuum (extraction port) in. wc inches of water column (in. wc) cfm Flow Rate (cu. ft. per min.)

between the indoor or outdoor air and deep locations during soil vapor extraction testing (in. wc.). Negative values indicate subsurface pressure is less than the indoor or outdoor air pressure. "NA" indicates the reading was not attainable.

Observed pressure differential

35 17.5 0 35

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-0.38

Extent of Deep Depressurization

Building 002

Vapor Intrusion Assessment 2018 Annual Report

> Former IBM Owego Facility Owego, New York

Drawn By: H. Pothier Designed By: J. Corsello Reviewed By: B. Green Project No: 4136.02 Date: February 2019

Figure Narrative

This figure shows measurements of differential pressure between indoor air and deep subslab vapor in units of inches of water column (in. wc) and the measurements recorded at each extraction port on June 20, 2018. Negative values indicate deep subslab pressures less than indoor pressure, or under vacuum, at the time of recording.

The -0.004 in wc contour represents the inferred apparent extent of deep (defined as >6 ft below ground surface, which is typically below the depth of an intermittently present layer of asphalt) subslab vacuum response. Actual vacuum conditions include components of vertical flow and are likely more complex than shown. Other interpretations are possible.

Legend

Subslab Extraction Port connected to depressurization (SSD) system

Subslab Extraction Port not \odot connected to SSD system

Soil Vapor Monitoring Point

Soil Vapor Extraction Well

• Monitoring Well

Differential pressure contour ---0:004-- (inches of water column). Dashed where less constrained.

EP002-003 **Extraction Port**

Applied Vacuum (extraction port) in. wc inches of water column (in. wc) cfm Flow Rate (cu. ft. per min.)

Observed pressure differential between the indoor or outdoor air and deep locations during soil vapor extraction testing (in. wc.). Negative values indicate subsurface pressure is less than the indoor or outdoor air pressure. "NA" indicates the reading was not attainable.

35 17.5 0 35

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-0.56

Extent of Subslab Depressurization

Building 351

Vapor Intrusion Assessment 2018 Annual Report

Former IBM Owego Facility Owego, New York

Drawn By: H. Pothier
Designed By: J. Corsello
Reviewed By: B. Green
Project No: 4136.02
Date: February 2019

Figure Narrative

This figure shows measurements of differential pressure between indoor air and subslab vapor in units of inches of water column (in. wc) and the measurements recorded at each extraction port on July 12, 2018. Negative values indicate subslab pressures less than indoor pressure, or under vacuum, at the time of recording.

The -0.004 in wc contour represents the inferred apparent extent of subslab vacuum response. Actual vacuum conditions include components of vertical flow and are likely more complex than shown. Other interpretations are possible.

Legend

Subslab Vapor Monitoring Point

•

Subslab Vapor Extraction Port connected to subslab depressurization (SSD) system

--0:004--

Differential pressure contour (inches of water column).

Dashed where less constrained.

EP351-001

Extraction Port

in. wc scfm Applied Vacuum (extraction port) inches of water column (in. wc)

Flow Rate (std. cu. ft. per min.)

-0.014

Observed pressure differential between the subslab and room during subslab vapor extraction test (in. wc). Negative values indicate subslab pressure is less than indoor air pressure.

Approximate Extent of the Basement



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APPENDIX A LIMITATIONS

APPENDIX A SHPC LIMITATIONS

- 1. The findings and conclusions described in this report are based in part on the data obtained from a finite number of samples from widely spaced locations. The figures are intended to depict inferred conditions during a given period of time, consistent with available information. The actual conditions will vary from that shown, both spatially and temporally. Other interpretations are possible. The nature and extent of variations between sampling locations may not become evident until further investigation is initiated. If variations or other latent conditions then appear evident, it may be necessary to re-evaluate the conclusions of this report.
- 2. Quantitative laboratory testing was performed by others as part of the investigation as noted within the report. Where such analyses have been conducted by an outside laboratory, unless otherwise stated in the report, SHPC has relied upon the data provided, and has not conducted an independent evaluation of the reliability of these data. It must be noted that additional compounds not searched for during the current study may be present in vapor and indoor air at the site. Moreover, it should be noted that variations in the types and concentrations of contaminants and variations in their distribution within the vapor and indoor air may occur due to the passage of time, seasonal water table fluctuations, recharge events, and other factors.
- 3. This report has been prepared for the exclusive use of the IBM Corporation for specific application to the former IBM Owego facility in accordance with generally accepted hydrogeologic and engineering practices. No warranty, expressed or implied, is made. The contents of this report should not be relied on by any other party without the express written consent of SHPC.
- 4. In preparing this report, SHPC has endeavored to conform to generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area. SHPC has attempted to observe a degree of care and skill generally exercised by the technical community under similar circumstances and conditions.

P:\4100s\4136.02\Source Files\2018 Annual Report\Appendix A\Appendix A - Limitations.doc

APPENDIX B ANALYTICAL LABORATORY AND DATA USABILITY REPORTS



1/18/2019 Ms. Erica Bosse Sanborn, Head & Associates 24 Wade Road

Latham NY

Project Name: Owego B001 IA

Project #: 4136.02

Workorder #: 1812373R1

Dear Ms. Erica Bosse

The following report includes the data for the above referenced project for sample(s) received on 12/18/2018 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Ausha Scott at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Ausha Scott

Project Manager



WORK ORDER #: 1812373R1

Work Order Summary

CLIENT: Ms. Erica Bosse BILL TO: Accounts Payable

Sanborn, Head & Associates Sanborn, Head & Associates

24 Wade Road 20 Foundry Street Latham, NY Concord, NH 03301

PHONE: 518-207-0769 P.O. # 2732.00

FAX: PROJECT # 4136.02 Owego B001 IA

DATE RECEIVED: 12/18/2018 CONTACT: Ausha Scott

DATE COMPLETED: 01/04/2019 **DATE REISSUED:** 01/18/2019

FRACTION#	<u>NAME</u>	TEST	RECEIPT <u>VAC./PRES.</u>	FINAL PRESSURE
01A	AA-01_20181212	Modified TO-15 SIM	3.3 "Hg	5.4 psi
01AA	AA-01_20181212 Lab Duplicate	Modified TO-15 SIM	3.3 "Hg	5.4 psi
02A	Dup-1_20181212	Modified TO-15 SIM	4.9 "Hg	4.9 psi
03A	EB-01_20181212	Modified TO-15 SIM	5.9 "Hg	4.9 psi
04A	IA001-004_20181212	Modified TO-15 SIM	4.9 "Hg	5.4 psi
05A	IA001-010_20181212	Modified TO-15 SIM	5.9 "Hg	4.8 psi
06A	IA001-014_20181212	Modified TO-15 SIM	4.7 "Hg	5 psi
07A	IA001-021_20181212	Modified TO-15 SIM	5.5 "Hg	4.5 psi
08A	IA001-025_20181212	Modified TO-15 SIM	5.3 "Hg	4.6 psi
09A	IA001-034_20181212	Modified TO-15 SIM	5.9 "Hg	5.1 psi
10A	IA001-052_20181212	Modified TO-15 SIM	3.5 "Hg	5.2 psi
11A	Lab Blank	Modified TO-15 SIM	NA	NA
12A	CCV	Modified TO-15 SIM	NA	NA
13A	LCS	Modified TO-15 SIM	NA	NA
13AA	LCSD	Modified TO-15 SIM	NA	NA

	The	cide 1	Payer		
CERTIFIED BY:			0	DATE:	01/18/19

Technical Director

Certification numbers: AZ Licensure AZ0775, FL NELAP - E8 , LA NELAP - 02089, NH NELAP - 209218, NJ NELAP - CA016, NY NELAP - 11291, TX NELAP - T104704434-18-13, UT NELAP CA009332018-10, VA NELAP - 9505, WA NELAP - C935

Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program) Accreditation number: CA300005-011, Effective date: 10/18/2018, Expiration date: 10/17/2019.

Eurofins Air Toxics LLC. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Eurofins Air Toxics LLC.



LABORATORY NARRATIVE Modified TO-15 SIM Sanborn, Head & Associates Workorder# 1812373R1

Ten 6 Liter Summa Canister (SIM Certified) samples were received on December 18, 2018. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	TO-15	ATL Modifications
ICAL %RSD acceptance criteria	=30% RSD with 2<br compounds allowed out to < 40% RSD	Project specific; default criteria is =30% RSD with 10% of compounds allowed out to < 40% RSD</td
Daily Calibration	+- 30% Difference	Project specific; default criteria is = 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers</td
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

Due to omission of the sampling date from the ID format on the sample tag, the information on the Chain of Custody (COC) was used to process and report the samples

Analytical Notes

Dilution was performed on samples Dup-1_20181212, IA001-004_20181212, IA001-010_20181212, IA001-014_20181212, IA001-021_20181212, IA001-025_20181212, IA001-034_20181212, and IA001-052_20181212 due to the presence of high level non-target species.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

- B Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
 - J Estimated value.
 - E Exceeds instrument calibration range.
 - S Saturated peak.



- Q Exceeds quality control limits.
- U Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
 - UJ- Non-detected compound associated with low bias in the CCV
 - N The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

- a-File was requantified
- b-File was quantified by a second column and detector
- r1-File was requantified for the purpose of reissue



Summary of Detected Compounds MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: AA-01_20181212

Lab ID#: 1812373R1-01A

	Rpt. Limit	Amount	Rpt. Limit	Amount
Compound	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
1.2-Dichloroethane	0.031	0.058	0.12	0.23

Client Sample ID: AA-01_20181212 Lab Duplicate

Lab ID#: 1812373R1-01AA

Compound	Rpt. Limit (ppbv)	(ppbv)	(ug/m3)	Amount (ug/m3)
1,2-Dichloroethane	0.031	0.060	0.12	0.24

Client Sample ID: Dup-1_20181212

Lab ID#: 1812373R1-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,2-Dichloroethane	0.32	3.2	1.3	13
Trichloroethene	0.32	0.73	1.7	3.9

Client Sample ID: EB-01_20181212

Lab ID#: 1812373R1-03A
No Detections Were Found.

Client Sample ID: IA001-004_20181212

Lab ID#: 1812373R1-04A

Compound	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)	
Trichloroethene	0.16	0.18	0.88	0.95	

Client Sample ID: IA001-010_20181212

Lab ID#: 1812373R1-05A

Compound	Rpt. Limit	Amount	Rpt. Limit	Amount
	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
Trichloroethene	0.33	0.73	1.8	3.9



Summary of Detected Compounds MODIFIED EPA METHOD TO-15 GC/MS SIM

Client Sample ID: IA001-014_20181212

Lab ID#: 1812373R1-06A
No Detections Were Found.

Client Sample ID: IA001-021_20181212

Lab ID#: 1812373R1-07A

	Rpt. Limit	Amount	Rpt. Limit	Amount
Compound	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
Trichloroethene	0.16	0.40	0.86	2.2

Client Sample ID: IA001-025_20181212

Lab ID#: 1812373R1-08A

Compound	Rpt. Limit (ppbv)	(ppbv)	(ug/m3)	(ug/m3)	
Trichloroethene	0.080	0.12	0.43	0.68	

Client Sample ID: IA001-034_20181212

Lab ID#: 1812373R1-09A

	Rpt. Limit	Amount	Rpt. Limit	Amount
Compound	(ppbv)	(ppbv)	(ug/m3)	(ug/m3)
Trichloroethene	0.084	0.32	0.45	1.8

Client Sample ID: IA001-052_20181212

Lab ID#: 1812373R1-10A
No Detections Were Found.



Client Sample ID: AA-01_20181212 Lab ID#: 1812373R1-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122006sim	Date of Collection: 12/12/18 6:16:00 PM
Dil. Factor:	1.53	Date of Analysis: 12/20/18 11:53 AM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
1,1-Dichloroethane	0.031	Not Detected	0.12	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.061	Not Detected
cis-1,2-Dichloroethene	0.031	Not Detected	0.12	Not Detected
1,1,1-Trichloroethane	0.031	Not Detected	0.17	Not Detected
1,2-Dichloroethane	0.031	0.058	0.12	0.23
Trichloroethene	0.031	Not Detected	0.16	Not Detected
Tetrachloroethene	0.031	Not Detected	0.21	Not Detected

		Method	
Surrogates	%Recovery	Limits	
1,2-Dichloroethane-d4	102	70-130	
Toluene-d8	97	70-130	
4-Bromofluorobenzene	101	70-130	



Client Sample ID: AA-01_20181212 Lab Duplicate

Lab ID#: 1812373R1-01AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122007sim	Date of Collection: 12/12/18 6:16:00 PM
Dil. Factor:	1.53	Date of Analysis: 12/20/18 12:29 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.015	Not Detected	0.039	Not Detected
1,1-Dichloroethane	0.031	Not Detected	0.12	Not Detected
1,1-Dichloroethene	0.015	Not Detected	0.061	Not Detected
cis-1,2-Dichloroethene	0.031	Not Detected	0.12	Not Detected
1,1,1-Trichloroethane	0.031	Not Detected	0.17	Not Detected
1,2-Dichloroethane	0.031	0.060	0.12	0.24
Trichloroethene	0.031	Not Detected	0.16	Not Detected
Tetrachloroethene	0.031	Not Detected	0.21	Not Detected

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	102	70-130



Client Sample ID: Dup-1_20181212 Lab ID#: 1812373R1-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122008sim	Date of Collection: 12/12/18 6:09:00 PM
Dil. Factor:	15.9	Date of Analysis: 12/20/18 01:05 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.16	Not Detected	0.41	Not Detected
1,1-Dichloroethane	0.32	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
cis-1,2-Dichloroethene	0.32	Not Detected	1.3	Not Detected
1,1,1-Trichloroethane	0.32	Not Detected	1.7	Not Detected
1,2-Dichloroethane	0.32	3.2	1.3	13
Trichloroethene	0.32	0.73	1.7	3.9
Tetrachloroethene	0.32	Not Detected	2.2	Not Detected

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	100	70-130



Client Sample ID: EB-01_20181212 Lab ID#: 1812373R1-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122009sim	Date of Collection: 12/12/18 3:12:00 PM
Dil. Factor:	1.66	Date of Analysis: 12/20/18 01:41 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.042	Not Detected
1,1-Dichloroethane	0.033	Not Detected	0.13	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.066	Not Detected
cis-1,2-Dichloroethene	0.033	Not Detected	0.13	Not Detected
1,1,1-Trichloroethane	0.033	Not Detected	0.18	Not Detected
1,2-Dichloroethane	0.033	Not Detected	0.13	Not Detected
Trichloroethene	0.033	Not Detected	0.18	Not Detected
Tetrachloroethene	0.033	Not Detected	0.22	Not Detected

		Method Limits	
Surrogates	%Recovery		
1,2-Dichloroethane-d4	108	70-130	
Toluene-d8	96	70-130	
4-Bromofluorobenzene	98	70-130	



Client Sample ID: IA001-004_20181212 Lab ID#: 1812373R1-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122010sim	Date of Collection: 12/12/18 5:57:00 PM
Dil. Factor:	8.15	Date of Analysis: 12/20/18 02:23 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.082	Not Detected	0.21	Not Detected
1,1-Dichloroethane	0.16	Not Detected	0.66	Not Detected
1,1-Dichloroethene	0.082	Not Detected	0.32	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.65	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.89	Not Detected
1,2-Dichloroethane	0.16	Not Detected	0.66	Not Detected
Trichloroethene	0.16	0.18	0.88	0.95
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected

		Method Limits	
Surrogates	%Recovery		
1,2-Dichloroethane-d4	108	70-130	
Toluene-d8	98	70-130	
4-Bromofluorobenzene	99	70-130	



Client Sample ID: IA001-010_20181212 Lab ID#: 1812373R1-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122011sim	Date of Collection: 12/12/18 6:09:00 PM
Dil. Factor:	16.5	Date of Analysis: 12/20/18 02:59 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.16	Not Detected	0.42	Not Detected
1,1-Dichloroethane	0.33	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.65	Not Detected
cis-1,2-Dichloroethene	0.33	Not Detected	1.3	Not Detected
1,1,1-Trichloroethane	0.33	Not Detected	1.8	Not Detected
1,2-Dichloroethane	0.33	Not Detected	1.3	Not Detected
Trichloroethene	0.33	0.73	1.8	3.9
Tetrachloroethene	0.33	Not Detected	2.2	Not Detected

		Method	
Surrogates	%Recovery	Limits	
1,2-Dichloroethane-d4	107	70-130	
Toluene-d8	98	70-130	
4-Bromofluorobenzene	102	70-130	



Client Sample ID: IA001-014_20181212 Lab ID#: 1812373R1-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122012sim	Date of Collection: 12/12/18 6:07:00 PM
Dil. Factor:	15.9	Date of Analysis: 12/20/18 03:35 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.16	Not Detected	0.41	Not Detected
1,1-Dichloroethane	0.32	Not Detected	1.3	Not Detected
1,1-Dichloroethene	0.16	Not Detected	0.63	Not Detected
cis-1,2-Dichloroethene	0.32	Not Detected	1.3	Not Detected
1,1,1-Trichloroethane	0.32	Not Detected	1.7	Not Detected
1,2-Dichloroethane	0.32	Not Detected	1.3	Not Detected
Trichloroethene	0.32	Not Detected	1.7	Not Detected
Tetrachloroethene	0.32	Not Detected	2.2	Not Detected

		Method	
Surrogates	%Recovery	Limits	
1,2-Dichloroethane-d4	107	70-130	
Toluene-d8	97	70-130	
4-Bromofluorobenzene	100	70-130	



Client Sample ID: IA001-021_20181212 Lab ID#: 1812373R1-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122013sim	Date of Collection: 12/12/18 6:12:00 PM
Dil. Factor:	8.00	Date of Analysis: 12/20/18 04:11 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.080	Not Detected	0.20	Not Detected
1,1-Dichloroethane	0.16	Not Detected	0.65	Not Detected
1,1-Dichloroethene	0.080	Not Detected	0.32	Not Detected
cis-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected
1,1,1-Trichloroethane	0.16	Not Detected	0.87	Not Detected
1,2-Dichloroethane	0.16	Not Detected	0.65	Not Detected
Trichloroethene	0.16	0.40	0.86	2.2
Tetrachloroethene	0.16	Not Detected	1.1	Not Detected

		Method	
Surrogates	%Recovery	Limits	
1,2-Dichloroethane-d4	109	70-130	
Toluene-d8	99	70-130	
4-Bromofluorobenzene	101	70-130	



Client Sample ID: IA001-025_20181212 Lab ID#: 1812373R1-08A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122014sim	Date of Collection: 12/12/18 5:59:00 PM
Dil. Factor:	4.00	Date of Analysis: 12/20/18 04:47 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.040	Not Detected	0.10	Not Detected
1,1-Dichloroethane	0.080	Not Detected	0.32	Not Detected
1,1-Dichloroethene	0.040	Not Detected	0.16	Not Detected
cis-1,2-Dichloroethene	0.080	Not Detected	0.32	Not Detected
1,1,1-Trichloroethane	0.080	Not Detected	0.44	Not Detected
1,2-Dichloroethane	0.080	Not Detected	0.32	Not Detected
Trichloroethene	0.080	0.12	0.43	0.68
Tetrachloroethene	0.080	Not Detected	0.54	Not Detected

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	100	70-130



Client Sample ID: IA001-034_20181212 Lab ID#: 1812373R1-09A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122015sim	Date of Collection: 12/12/18 6:04:00 PM
Dil. Factor:	4.20	Date of Analysis: 12/20/18 05:24 PM

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.042	Not Detected	0.11	Not Detected
1,1-Dichloroethane	0.084	Not Detected	0.34	Not Detected
1,1-Dichloroethene	0.042	Not Detected	0.17	Not Detected
cis-1,2-Dichloroethene	0.084	Not Detected	0.33	Not Detected
1,1,1-Trichloroethane	0.084	Not Detected	0.46	Not Detected
1,2-Dichloroethane	0.084	Not Detected	0.34	Not Detected
Trichloroethene	0.084	0.32	0.45	1.8
Tetrachloroethene	0.084	Not Detected	0.57	Not Detected

		Method
Surrogates	%Recovery	Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	101	70-130



Client Sample ID: IA001-052_20181212 Lab ID#: 1812373R1-10A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122016sim	Date of Collection: 12/12/18 6:26:00 PM
Dil. Factor:	15.3	Date of Analysis: 12/20/18 06:01 PM

Dil. Factor:	15.3	Date	of Analysis: 12/20)/18 06:01 PM
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.15	Not Detected	0.39	Not Detected
1,1-Dichloroethane	0.31	Not Detected	1.2	Not Detected
1,1-Dichloroethene	0.15	Not Detected	0.61	Not Detected
cis-1,2-Dichloroethene	0.31	Not Detected	1.2	Not Detected
1,1,1-Trichloroethane	0.31	Not Detected	1.7	Not Detected
1,2-Dichloroethane	0.31	Not Detected	1.2	Not Detected
Trichloroethene	0.31	Not Detected	1.6	Not Detected
Tetrachloroethene	0.31	Not Detected	2.1	Not Detected

		Method
Surrogates	%Recovery	Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130



4-Bromofluorobenzene

Client Sample ID: Lab Blank Lab ID#: 1812373R1-11A

MODIFIED EPA METHOD TO-15 GC/MS SIM

MODIFIED EPA METHOD TO-15 GC/MS SIM				
File Name: Dil. Factor:	22122005sim 1.00		of Collection: NA of Analysis: 12/20	0/18 11:01 AM
Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
Container Type: NA - Not A	pplicable			
				Method
Surrogates		%Recovery		Limits
1,2-Dichloroethane-d4		104		70-130
Toluene-d8		95		70-130

105

70-130



Client Sample ID: CCV Lab ID#: 1812373R1-12A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122002sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/20/18 08:55 AM

Compound	%Recovery	
Vinyl Chloride	95	
1,1-Dichloroethane	91	
1,1-Dichloroethene	88	
cis-1,2-Dichloroethene	93	
1,1,1-Trichloroethane	88	
1,2-Dichloroethane	81	
Trichloroethene	86	
Tetrachloroethene	84	

Container Type: NA - Not Applicable

		Method
Surrogates	%Recovery	Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	106	70-130



Client Sample ID: LCS Lab ID#: 1812373R1-13A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122003sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/20/18 09:39 AM

_		Wethod	
Compound	%Recovery	Limits	
Vinyl Chloride	97	70-130	
1,1-Dichloroethane	90	70-130	
1,1-Dichloroethene	87	70-130	
cis-1,2-Dichloroethene	86	70-130	
1,1,1-Trichloroethane	88	70-130	
1,2-Dichloroethane	79	70-130	
Trichloroethene	86	70-130	
Tetrachloroethene	84	70-130	

Container Type: NA - Not Applicable

		Method Limits	
Surrogates	%Recovery		
1,2-Dichloroethane-d4	96	70-130	
Toluene-d8	103	70-130	
4-Bromofluorobenzene	106	70-130	



Client Sample ID: LCSD Lab ID#: 1812373R1-13AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	22122004sim	Date of Collection: NA
Dil. Factor:	1.00	Date of Analysis: 12/20/18 10:23 AM

Compound	%Recovery	Method Limits
Vinyl Chloride	98	70-130
1,1-Dichloroethane	89	70-130
1,1-Dichloroethene	89	70-130
cis-1,2-Dichloroethene	88	70-130
1,1,1-Trichloroethane	88	70-130
1,2-Dichloroethane	78	70-130
Trichloroethene	87	70-130
Tetrachloroethene	84	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits	
1,2-Dichloroethane-d4	97	70-130	
Toluene-d8	100	70-130	
4-Bromofluorobenzene	110	70-130	



Data Usability Summary Report (DUSR) NYSDEC ASP Category B

Client/Company: Sanborn, Head & Associates, Inc., Concord, New Hampshire (SHA)

Site/Project Name: Former IBM Owego Facility, Owego, NY

Owego B001 IA Sampling

Laboratory: Eurofins Air Toxics Inc., Folsom, CA

Work Order #: 1812373

Date(s) of Collection: December 12, 2018

Number and type

Samples & analyses: 8 Indoor Air, 1 Ambient Air, and 1 Equipment Blank for 8 project-specific

Volatile Organic Compounds (VOCs) by Method TO-15 SIM

Senior Data Reviewers: Dr. Nancy C. Rothman, New Environmental Horizons, Inc.

Susan D. Chapnick, New Environmental Horizons, Inc.

Date Completed: January 29, 2019

This Data Usability Summary Report (DUSR) is based on guidance developed by the New York State Department of Conservation (NYSDEC), June 1999, for technical review of analytical data in lieu of a full third party data validation. The objective of the DUSR is to determine whether or not the data as presented meet NYSDEC ASP 2005 or EPA method QC acceptance criteria.

I. Required DUSR Questions

1. Is the data package complete as defined under the requirements for the most current NYSDEC ASP Category B or USEPA CLP deliverables?

Yes.

2. Have all holding times been met?

Yes.

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

Yes.

4. Have all of the data been generated using established and agreed upon analytical protocols?

Yes. Analytical data were generated using established EPA Methods (see analytical references in Section II below). Deviations from EPA and NYSDEC ASP 2005 QC protocols are discussed in the DV Checklists of this DUSR.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

Yes. The raw data were checked to verify that detected results met retention time and mass spectral criteria, where applicable, for qualitative identification. A spot check was performed to verify quantitative accuracy for reporting of all results (see the DV Checklists).

6. Have the correct data qualifiers been used and are they consistent with the most current NYSDEC ASP?

Yes. The laboratory used the correct data qualifiers in reporting of results. The data were unchanged as a consequence of this review.

7. Have any quality control (QC) exceedances been specifically noted in the DUSR and have the corresponding QC summary sheets from the data package been attached to the DUSR?

Yes. QC exceedances are specified in the DV Checklists. QC summary sheets from the data package have not been attached since the only QC exceedance was a documentation issue on the Chain-of-Custody.

2 NEH, Inc.

II. Sample Descriptions and Analytical Parameters

The sample IDs, date of sampling, identification of MS/MSD, LD, FD, EB, TB, if applicable and the analytical parameters reviewed in this DUSR are listed in Table 1. Any deviations noted for sample collection or receipt (*e.g.*, temperature or preservation issues) are included in Section III, below.

Table 1. Sample Descriptions and Analytical Parameters

Sample ID	Collection Date	Matrix	Analytical Parameters	Sample Type
AA-01_20181212	12/12/2018	Ambient Air	VOCs	Field Sample [used for LD]
Dup-1_20181212	12/12/2018	Indoor Air	VOCs	Field Duplicate of IA001- 010_20181212
EB-01_20181212	12/12/2018	Air	VOCs	Equipment Blank
IA001-004_20181212	12/12/2018	Indoor Air	VOCs	Field Sample
IA001-010_20181212	12/12/2018	Indoor Air	VOCs	Field Sample
IA001-014_20181212	12/12/2018	Indoor Air	VOCs	Field Sample
IA001-021_20181212	12/12/2018	Indoor Air	VOCs	Field Sample
IA001-025_20181212	12/12/2018	Indoor Air	VOCs	Field Sample
IA001-034_20181212	12/12/2018	Indoor Air	VOCs	Field Sample
IA001-052_20181212	12/12/2018	Indoor Air	VOCs	Field Sample

Analytical method reference:

VOC: Method TO-15 operated in the Selected Ion Monitoring (SIM) mode for eight project-specific VOCs (1,1,1-Trichloroethane, 1,1-Dichloroethane, 1,1-Dichloroethene, 1,2-Dichloroethane, cis-1,2-Dichloroethene, Tetrachloroethene, Trichloroethene, and Vinyl Chloride)

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III. Data Deficiencies, Analytical Protocol Deviations, and Quality Control Problems

The following QC elements, as applicable to the analytical methods, were reviewed during this DUSR:

- Data package completeness and reporting protocols
- Sample receipt, holding times, and preservation criteria
- Calibration criteria (instrument tuning, initial and continuing calibration verifications)
- Method, field, and instrument blank results
- Laboratory Control Sample (LCS), Blank Spike (BS), or Matrix Spike Blank (MSB) recoveries
- Surrogate or Internal Standard (IS) Recoveries
- Sample/Laboratory Duplicate (LD) or sample/Field Duplicate (FD) Relative Percent Differences (RPDs)
- Sample result reporting (including reporting limits and units)
- Other method-specific QC if applicable and reported (e.g., internal standard areas)
- Deficiencies or protocol deviations as noted in the Laboratory Narrative

During this review of VOCs, there were no rejections of data. Two results were estimated (J or UJ) due to QC issues. Table 2 summarizes the actions taken during this review. NEH generated a validated data spreadsheet based on the electronic project database file received from SHA for this Work Order. All results were considered acceptable compared to NYSDEC ASP 2005, method, and Work Plan criteria and usable for project decisions with the understanding of the potential uncertainty (bias) in the qualified results and uncertainty in non-detected results with reporting limits (RLs) that exceed sensitivity requirements.

As required by the DUSR, the DV Checklist attached to this DUSR documents the QC reviewed and the issues that required action or affected the data certainty in terms of the project data quality objectives (DQO) of accuracy, precision, representativeness, comparability, and sensitivity. The DQO of completeness can be evaluated by the project manager after all data are generated.

The narrative indicated that the sampling date was omitted from the canister sample tags (e.g., "AA-01_20181212" was listed as "AA-01" on the canister tag). The lab reported the sample ID's in the EDD and hardcopy data as they appeared on the Chain-of-Custody.

The laboratory was unable to perform the flow controller checks since the flow controllers were detached from the cylinders for transit from the field back to the laboratory. Since the sample collection times (8 hours for all samples except the Equipment Blank, which was ~5 hours) and initial, field final, and lab receipt vacuums were acceptable, sample collection was considered acceptable and the lack of the flow controller check does not affect data usability.

The Method and Equipment Blanks were non-detect for all target compounds; therefore, blank action was not required.

Precision was acceptable for all target VOCs in the Field Duplicate pair IA001-010_20181212 and DUP-1_20181212 except for 1,2-dichloroethane. The result for 1,2-dichloroethane was estimated (J or UJ) in the FD pair as sown in Table 2 with indeterminate bias due to FD

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imprecision. These results are an indication of acceptable precision from sample collection through analysis for the target VOCs except for 1,2-dichloroethane in these samples.

All samples except AA-01_20181212 were diluted at the instrument level (Dilution Factor (DF) = 2.5, 5, or 10) due to the presence of high non-target compounds in the samples, according to the narrative. All non-detects for the 8 target VOCs were below the Project required reporting limits except: tetrachloroethene, cis-1,2-dichloroethene, 1,1-dichloroethene, 1,1,1-trichloroethane, and 1,1-dichloeoethane in samples Dup-1_2018122, IA001-010_20181212, IA001-014_20181212, and IA001-052_20181212; trichloroethene in samples IA001-014_20181212 and IA001-052_20181212; vinyl chloride in all samples except AA-01_20181212; and 1,2-dichloroethane in samples IA001-010_20181212, IA001-014_20181212, and IA001-052_20181212. Data users will need to evaluate these elevated non-detects for project uses.

All other quality control information associated with accuracy, precision, and sensitivity for the VOCs reported met method and Work Plan criteria for the samples in this Work Order with the exceptions included in Table 2.

Table 2. Summary of Data Validation Actions

Field Sample ID	Analyte	Qualifier	Bias	Validation Comments
Dup-1_20181212 IA001-010_20181212	1,2-Dichloroethane	J or UJ	I	FD imprecision

Qualifiers: U = Analyte is non-detect at or above the sample-specific reporting limit (RL); UJ = Non- detect is estimated at the RL; J = Result is estimated; EB = Analyte was also present in a Field Equipment Blank; R = Result is rejected and is unusable for project decisions.

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Bias: L = Low; H = High; I = Indeterminate

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SHA: Soil Vapor Intrusion Assessment, Former IBM Owego Facility, Owego, NY

Date Sampled: <u>12/12/18</u> Method of Analysis: TO-15 SIM No. Samples 7 IA + 1 AA + 1 FD + 1EB

Data Element Acceptable	Canister Receipt	нт	GC/MS Tunes + Calibrations	Internal Stds + Surrogates	LCS	Lab Dup (LCS and LD)	Field Duplicates	RL & Quant.
Yes	٧	٧	٧	٧	٧	٧		
No							Estimate (J or UJ) 2 results	Several non- detects exceeded sensitivity requirements

Other Issues:	None

The data package consisted of a NYDEC Category B deliverable. A full validation review was performed using result forms, Quality Control forms, preparation/analysis logs, and raw instrument data associated with this data package, which involved evaluation of the following (where applicable): agreement of analyses conducted with COC requests; Holding times and sample preservation; Laboratory blanks and Field blank results compared to field sample results; Field duplicate results; Quantitation limits and sample results; LCS/LCSD results; Laboratory duplicate results; instrument tunes and instrument initial and continuing calibrations; evaluation of laboratory qualifiers applied to the dataset; and selected result calculation verification. The laboratory narrative was also reviewed to determine whether additional issues were found that were not reported in the QC evaluated. Data users should reference the RFI Work Plan for further details.

Data Package Completeness:

- 1. Were all required forms (results, summary QC, COC), as required to validate the data in accordance with the EPA DV guidance present in the data package? Yes. A full data deliverable, including results, summary QC, and all raw data, was provided for review.
- 2. Were all result forms for all samples listed on the chain-of-custody present in data package? Yes.

Sample receipt: The 10 6-L canisters were received intact and in good condition on 12/18/18. The Chain-of-Custody (COC) indicates the project is Owego B001 IA. The narrative indicated that the sampling date was omitted from the canister sample tag (e.g., "AA-01_20181212" was listed as "AA-01" on the canister tag). The lab reported the sample ID's reported in the data as they appeared on the COC.

Certification: Canisters were individually certified pre-cleaned on 12/3/18-12/4/18 prior to shipment to the field for all target VOCs - No Action required.

Date: **1/25/19**

Associated Blanks:	Method Blank: 22122005sim
	EB = EB-01_20181212

Blank ID	Contaminant / Level (μg/m³)	Action Level DF=	Sample and reported result (µg/m3)	Corrected Database Result
22122005sim	None		No Blank Action Required	
EB-01_20181212	None		No Blank Action Required	

Additional Notes:

Sample Integrity: For these samples, the field receipt vacuums (-26.5 to -30 "Hg), field final vacuums (- 3 to -6.5 "Hg) and lab receipt vacuums (-3.3 to -5.9 "Hg) were acceptable. COC indicated vacuums as positive pressures rather than negative "Hg, which is acceptable. All field final and lab receipt vacuums agree within ±5 "Hg. The flow controllers were removed from the canisters for shipment so it was not possible for the lab to do a flow controller check. These samples were an approximate 8 hour collection (except for the EB which was collected in 5 hours). Since the final vacuums upon receipt for the canisters were acceptable, the flow controllers must have been operating properly. No action required. Upon receipt at the lab, all samples were over-pressurized to 4.5-5.4 psi.

Holding Time (HT): Samples were analyzed by 12/20/18; therefore HT was met. No Action required.

BFB Tunes: Instrument msd22 2 tunes (1 ICAL + 1 CCV). Method TO-15 tune criteria used and tunes were acquired properly (average of 3 scans across BFB peak with background subtraction). All criteria in both tunes were met and all samples were analyzed within 12 hours of tune; therefore, No Action Required.

ICAL: SIM performed on 12/4/18. Lab performed SIM for all compounds of interest even though Full Scan RLs would have satisfied the QA/QC requirements of Table B.1 of Appendix B to the RFI Work Plan. ICAL shows more compounds than requested. For VC, 10 level ICAL from 0.002 to 20 ppbV; 1,1=DCE and 1,2-DCA 9 level ICAL from 0.004 to 20 ppbV, and for the remaining 5 compounds, 8-level ICAL from 0.01 to 20 ppbV. %RSD \leq 30% for all 8 Target Compounds. RLs reported for all 8 compounds were 0.01 to 0.02 ppbV for DF=1 (levels reported for the Method Blank), which were supported by the ICAL.

CCV: 12/20/18 - %Recovery was within 70-130% (i.e., %D \leq ± 30%) for all 8 Target compounds - No Action required.

Surrogates & Internal Standards: All 3 surrogates (1,2-Dichloroethane-d4, Toluene-d8, ad 4-Bromofluorobenzene) were recovered within 70-130% and all 3 IS' (Chlorobenzene-d5, 1,4-Difluorobenzene, and Bromochloromethane) had areas and RTs within criteria in all analyses; therefore, No Action Required.

LCS/LCSD: 22122003sim/22122004sim. %Recovery for all 8 Targets in LCS & LCSD and LCS/LCSD RPDs were all acceptable; therefore, acceptable accuracy and precision demonstrated for analysis of the 8 VOCs by TO-15 SIM analysis.

Date: <u>1/25/19</u>

Additional Notes:

LD: analysis performed on sample AA-01 20181212. RPD between sample/LD was within 20% for all results; therefore, Sample/LD precision acceptable. No Action required.

FD: IA001-010 20181212 & DUP-1 20181212. A comparison between these two samples is shown below.

Field Duplicate Evaluation_ Sample IDs:		Sam	ple =	IA001-010_20181	212		FD =	DUP-1_20181	1212	
Analyte Name	DF=16.5* QL (μg/m³)	Sample μg/m³	Q	Sample Result Level	FD μg/m³	Q	FD Result Level	RPD		Action *
Trichloroethene	1.8	3.9		< 5 x QL	3.9		< 5 x QL	0.0		None
Vinyl Chloride	0.42	0.42	U	QL	0.41	U	QL	NA		None
1,1-Dichloroethane	1.3	1.3	U	QL	1.3	U	QL	NA		None
1,1-Dichloroethene	0.65	0.65	U	QL	0.63	U	QL	NA		None
cis-1,2-Dichloroethene	1.3	1.3	U	QL	1.3	U	QL	NA		None
1,1,1-Trichloroethane	1.8	1.8	U	QL	1.7	U	QL	NA		None
1,2-Dichloroethane	1.3	1.3	U	QL	13		> 5 x QL	NA		J or UJ
Tetrachloroethene	2.2	2.2	U	QL	2.2	U	QL	NA		None

^{*} FD DF = 16.5 so FD RLs were RLs shown X 15.9/16.5

FD precision was acceptable for all 8 target VOCs in IA001-010_20181212 & DUP-1_20181212 except for 1,2-Dichloroethane which was reported > 5 x RL in FD and was non-detect in sample.

*ACTION: 1,2-Dichloroethane estimated (J or UJ) in IA001-010_20181212 & DUP-1_20181212 with indeterminate bias due to FD imprecision.

Compound Reporting: the lab reported results for 8 Target VOCs, as requested in the Table B.1 (Appendix B, RFI Work Plan) and on the COC.

Qualifier Action: There were no qualifiers other than "U" placed on the data (i.e., no "J" results reported). All data were reported within the instrument calibration range.

Sensitivity: All results were reported in units of μg/m³ and ppbV. All samples except AA-01_20181212 were diluted at the instrument level (DF=2.5, 5, or 10) due to the presence of high non-target compounds, according to the narrative. Instrument log indicates isopropanol and/or acetone were high in these samples. All non-detects for the 8 target VOCs were below the Project required reporting limits shown on page 6 except: tetrachloroethene, cis-1,2-dichloroethene, 1,1-dichloroethene, 1,1,1-trichloroethane, and 1,1-dichloeoethane in samples Dup-1_2018122, IA001-010_20181212, IA001-014_20181212, and IA001-052_20181212; trichloroethene in samples IA001-014_20181212 and IA001-052_20181212; vinyl chloride in all samples except AA-01_20181212; and 1,2-dichloroethane in samples IA001-010_20181212, IA001-014_20181212, and IA001-052_20181212. The data users will need to evaluate these elevated non-detects for project uses.

Date: **1/25/19**

^{**}Action only taken for RPD > 20% if one or both results are > 5 x QL; Q = Validator Qualifier

Additional Notes:

The sample chromatograms and quantitation reports were scanned and data appeared to have been reported correctly. The quantitation reports reported results for trans-1,2-dichloroethene, in addition to the 8 target compounds; however, trans-1,2-dichloroethene was not reported in the final data.

Narrative: The narrative indicated the lab's inability to perform the flow controller check when the canisters were returned to the lab. There were no other issues noted that would have affected sample data quality or which have not already been addressed in this review.

Calculation Verification Checks:

Initial Calibration : Verification msd22 SIM ICAL on 12/4/18 for Trichloroethene with IS 1,4-Difluorobenzene:

	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	
Std Conc.	0.01	0.02	0.1	0.5	1	5	
Cpd Resp	472	886	5005	21879	42647	260352	
IS Conc.	5	5	5	5	5	5	
IS Resp	399742	382934	402664	380602	360114	468052	
RRF	0.5904	0.5784	0.6215	0.5749	0.5921	0.5562	

	Level 7	Level 8	Avg. RRF	%RSD
Std Conc.	10	20		
Cpd Resp	488764	892764		
IS Conc.	5	5		
IS Resp	485350	480088		
RRF	0.5035	0.4649	0.5602	9.19%

ICAL verified, no action required

CCV: Verification msd22 12/20/18 for 10 ppbV Standard of 1,2-Dichloroethane: Response for Compound =273363; IS Response = 401237 @5 ppbV; RRF from ICAL = 0.42219

Conc. =
$$\frac{273363 \times 5}{401237 \times 0.42219}$$
 = 8.07 ppbV

% Rec =
$$\frac{100 \text{ X} (8.07)}{10}$$
 = 80.7% = 81% $\sqrt{}$

Date: **1/25/19**

QL & Result Verification: IA001-010_20181212; Trichloroethene

Canister was received at 5.9 "Hg and over-pressurized to 4.8 psi so DF=1.65 due to over-pressurization only; only 25 mL of sample analyzed compared to normal volume of 250 mL so dilution at instrument was DF = 10 and overall DF = 1.65 x 10 = 16.5; MWt = 131.4

Sample Response = 1508; IS Response = 303794@ 5; RRF ICAL = 0.5602

$$\mu g/m^3 = (ppbv \times Mwt \times DF) / 24.45 = (0.7310 \times 131.4 \times 1)/24.45 = 3.93 = 3.9 \,\mu g/m^3$$

QL based on 0.020 ppbV level =
$$(0.020 \times 16.5 \times 131.4)/24.45 = 1.77 = 1.8 \,\mu\text{g/m}^3$$

Compound List and Project-required Reporting Limits (RL) - from Table B.1 from Appendix B, QA/QC Plan for RFI Work Plan

Target Analyte Name	Full Scan (Full) or SIM	RL (μg/m³)
Tetrachloroethene (PCE)	Full	1.4
Trichloroethene (TCE)	SIM	0.22
cis-1,2-Dichloroethene (cDCE)	Full	0.8
1,1-Dichloroethene (DCE)	Full	0.8
Vinyl chloride (VC)	SIM	0.052
1,1,1-Trichloroethane (TCA)	Full	1.1
1,1-Dichloroethane (1,1-DCA)	Full	0.81
1,2-Dichloroethane (1,2-DCA)	Full	0.81

Actions (see references below):

Canister Integrity:	If narrative indicates issues, J/U or UJ results in samples based on professional judgment; if Flow controller RPD > 20% for pre- and post-flow calibrations, J detect/UJ non-detects
Canister Vacuum (Vac):	Initial Field Vac < 25" Hg, J/UJ all results; Lab Receipt Vac > 15" Hg, J/UJ results; Lab Receipt Vac > ± 5" Hg of Final Field Vac, J/UJ results
Hold Time (HT):	HT > 30 days, J detects/ UJ non-detects
Blank Actions:	Sample-specific Blank Action Level = Action Level x (Sample DF/Blank DF)
	If MB < RL and sample result < RL, negate(U) sample result at RL. If MB > RL and sample result < RL, negate(U) sample result at RL; if sample result > RL but < Level in MB, negate (U) result in sample at level reported
	Equipment Blank (EB): If sample result < EB, qualify (EB) sample result at level reported
BFB Tune:	SW-846 method 8260B or TO-15 tune criteria not met, professional judgment on R of all data; samples analyzed > 12-hours after tune; professional judgment on J/UJ or R of results
LCS and CCV:	Percent Recovery (%Rec) <10%, J- detects, R non-detects; 10% < %Rec <70%; J-/UJ all associated data; %Rec >130%, J+ detects - no action for non-detects
Initial Calibration (ICAL):	%RSD > 30%, J/UJ associated results
Internal Standard (IS):	RT > ±0.33 min of IS RT in daily CCV, J/UJ associated results;
	Area < 25% Area in CCV, J detects, R non-detects (or professional judgment); 25% Area < 60% of CCV Area, J/UJ associated results; Area > 140% of CCV Area, J detects, no action for non-detects

Date: <u>1/25/19</u>

Actions continued (see references below):

Surrogates:	%Rec <10%, J- detects, R non-detects; 10% < %Rec <70%; J-/UJ all associated data; %Rec >130%, J+ detects - no action for non-detects
Laboratory Duplicates:	LCS/LCSD RPD or Sample/LD RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
Field Duplicates:	RPD > 20% for detects > 5x RL, J associated data; professional judgment for results < 5 x RL
RLs + Quant:	Compound reported outside calibration range (< RL or at ppbV level > sample-specific highest ICAL standard for compound), J data. Note if RL > expected RL from Table B.1 of Assessment Plan (see page 5)
DV Qualifier Definitions:	U = analyte is non-detect at the sample-specific Quantitation Limit (usable); UJ = non-detect is usable as an estimated value; J = result is usable as an estimated value with indeterminate bias; J+ = result is usable as an estimated value with possible high bias; J- = result is usable as an estimated value with possible low bias; NJ = the analyte has been "tentatively identified" and the result is usable as an estimated value with indeterminate bias; EB = compound also found in an associated Equipment Blank and result may be biased high; and R = result is rejected due to severe QC exceedance and unusable for project objectives. Bias: L = Low; H = High; I = Indeterminate.
References:	RFI Work Plan - Soil Vapor Intrusion Assessment, Former IBM Owego Facility, Owego, New York, prepared by Sanborn, Head & Associates, February 2017; NYSDOH, Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 with updates through 2015; NYSDEC Analytical Services Protocol, June 2005 with NYSDEC Modifications to the EPA Region 9 TO-15 QA/QC Criteria, February 2008; USEPA Region II SOP HW-31, Validating Air Samples, Volatile Organic Analysis of Ambient Air in Canisters by Method TO-15, Rev. 6, June 2014; and Method TO-15, Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS), Publication EPA/625/R-96/010b, January 1999.

SUPPORTING DOCUMENT 2

August 10, 2020 | 4:17 pm

Information on Novel Coronavirus

Coronavirus is still active in New York. We have to be smart. Wear a mask and maintain 6 feet distance in public.

Environmental Site Remediation Database Search Details

Site Record

Document Repository

Site-related documents are available for review through the DECInfo Locator on line at **DECInfoLocator**

Administrative Information

Site Name: International Business Machines (IBM)

Site Code: 754006

Program: Resource Conservation and Recovery

Classification: 04 **EPA ID Number:**

Location

DEC Region: 7 Address: Route 17C City:Owego Zip: 13827

County:Tioga

Latitude: 42.101388889 Longitude: -76.220277778

Site Type: DUMP LAGOON LANDFILL

Estimated Size: 167.2 Acres

Site Owner(s) and Operator(s)

Current Owner Name: LOCKHEED MARTIN SYSTEMS INTEGRATION

Current Owner(s) Address: 1801 STATE ROUTE 17C

OWEGO, NY, 13827-3998

Current Owner Name: Lockheed Martin Systems Integration - Owego

Current Owner(s) Address: 1801 State Route 17C

Owego, NY, 13827

Owner(s) during disposal: IBM Corporation **Current On-Site Operator: UNKNOWN3**

Stated Operator(s) Address:

.ZZ

Hazardous Waste Disposal Period

Site Description

Location: The IBM Owego site is located in a rural portion of southern Tioga County, New York, between Route 17C and Bodle Hill Road, east of the village of Owego. Site Features: The active portion of the site covers 26 acres and is occupied by buildings constructed on a low hill in the northeastern portion of the site. Current use/Zoning: The site is currently active and principally involved in the manufacture of computer systems for military applications. The surrounding parcels are currently used for a combination of light industrial, commercial, and utility right-of-ways. The nearest residential area is located just southeast of the site. Historic Use: Prior uses that appear to have led to site contamination include releases of solvents from bulk chemical storage and wastewater treatment facility areas. In June 1978, IBM began a voluntary cleanup program to assess the groundwater quality underlying this site. Various investigations have been completed including assessment of groundwater, surface water, soil, and indoor air. The remedial program, which includes a groundwater monitoring, collection and treatment program, is ongoing. Prior uses that appear to have led to site contamination include releases of solvents from bulk chemical storage and wastewater treatment facility areas. In June 1978, IBM began a voluntary cleanup program to assess the groundwater quality underlying this site. Various investigations have been completed including assessment of groundwater, surface water, soil, and indoor air. The remedial program, which includes a groundwater monitoring, collection and treatment program, is ongoing. RCRA Status: Corrective action requirements for Solid Waste Management Units have been addressed under the Part 373 permit. The property boundaries of this site have been redefined twice. In June 2002 in response to a petition from the owner a parcel in the southwest corner of the facilty was removed from the property boundary and transferred to Tioga IDA. In 2002 the former Gleason property was added to the property boundry because Lockheed Martin purchased the adjacent parcel. The new parcel is considered contiguous property because the facility is currently owned by Lockheed Martin Corporation. The site; s industrial waste treatment facilities and locations of former industrial waste treatment lagoons are located in the northwestern portion of the site. The lagoons were removed from the permit due to the Contained-In Demonstration determination made April 13, 2006. On March 30, 2010, a corrective action only permit was issued for the facility to operate the pump and treat system. Lockheed Martin is identified as the owner and IBM is the operator of the permit. The current permit will expire March 29, 2020 and will be SAPA extended because their application was received. Semi-annual groundwater monitoring will continue to be conducted under this permit.

Contaminants of Concern (Including Materials Disposed)

Contaminant Name/Type
METHYL CHLOROFORM
methylene chloride
TRICHLOROETHYLENE (TCE)

Site Environmental Assessment

The primary contaminants of concern at the site include 1,1,1-trichloroethane, trichloroethene, and breakdown products of these constituents. Investigations indicate that groundwater contamination has been identified beneath the IBM-Owego property that extends just south of the property boundary in the vicinity of the Route 17C interchange. Exceedances of standards, criteria, and guidelines include chlorinated VOCs. The groundwater pump and treat system has been operating for over 20 years with enhancements being made as appropriate. The system has been effective in reducing contaminant levels. The site does not present a significant threat to the environment.

Site Health Assessment

Exposure to contaminated groundwater is not expected because the area is served by municipal water. Public access is limited by partial fencing and security guards. NYSDOH and NYSDEC will evaluate the need for additional investigations to determine the potential for soil vapor intrusion into structures on or near the site.

For more Information: E-mail Us

